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THE Eastern complication is approaching what we are sorry to regard as the only desirable solution, viz., the invasion of Turkey by Russia, and the involving Eastern Europe in a great conflict between the Mohammedan and the Christian. The Russian is not the sort of government we especially admire; and while we readily understand, we by no means share the sympathy which many Americans entertain for it. We regard it as a despotism, whose power retards the political development of a great cluster of nations, and especially as a despotism which alone, of all monarchical despotisms, has avowed sympathies with that despotism of the many, that negation of all freedom and individuality—communism. The extension of the Czar's empire to the Bosphorus and beyond it, the conversion of the Black sea into a Russian lake, and the extinction of the partial independence of the Danubian provinces and their Russification, we regard as little less than disasters to Europe at large. But since the rest of the Great Powers have failed to do their duty to Christendom and to humanity, Russia has fairly earned her great opportunity to gain the long-coveted site of empire, the New Rome of eastern Christendom. One more step is thus made to execute the *Testament* of Peter the Great, and to secure, to what is intellectually the least cultivated and politically the least advanced of the great European races, the initiative in the continent's politics.

The diplomatic discussion of the situation among the Great Powers seems to be degenerating into a vigorous scolding-match between

England and Russia, if the utterances of the semi-official newspapers be any guide as to its drift. Especially pathetic is the English appeal to Germany, as the government which holds the balance of power, and can bring everything right if it will. "Thank you for the compliment," is Germany's answer in substance; "I believe I am big and strong enough to whip you, or Russia either. But then, as your Premier puts it, each nation's chief duty is to look after its own interests. So before I interfere, I'll know what it is for." An answer which does not at all rejoice France—France hoping for a general scrimmage in which she and Austria might have Russia's help to wipe out some not very old scores. On the other hand, it seems that Turkey's two heirs apparent, Austria and Russia, have come or are rapidly coming to an understanding on the subject. The latter has made a proposal for joint invasion, Austria to take charge of Bosnia and Herzogovina, and Russia to occupy Bulgaria; and Austria seems to be coquetting with it. She would not long hesitate, if she only knew that Bismarck had no objections, and she could keep the Hungarians from revolting against new additions of Slavonic territory to the dual Empire. But she will not agree to the construction of new Slavonic states. Italy is another friend whom Russia must keep in good humor. She wants the control of Mediterranean commerce, and does not like to see so much of it pass under Russian control. So she makes a public announcement to Europe as to what a fine large army she has—"just to please our people, you know; it has cost them a pretty penny." And then she hints that if Russia must have the Euxine, she in all fairness might very well get Tunis and the Italian Tyrol. And so on all sides the solution that English policy has striven to avoid or put off seems to be growing every day nearer and more certain.

In the actual theatre of the struggle, no event of military importance has occurred since the expiry of the truce. Neither against the Servians nor the Montenegrins have the Turks made any further headway. The best military movement of the Turks has been their proposal for a six months' truce, keeping everything *in statu quo*. They have everything to gain by such a proposal. The indignation of the Christian nations would grow cool by that time; the good services of England and the general dislike of war would help to a solution more favorable to them than any as yet proposed. And

the Servians could not by any possibility keep up their army through the winter. Therefore those gentle lambs, the Pashas, are eager for a good long cessation of hostilities. But as Servia is astute enough to refuse even to consider such a proposal, and as Russia has no intention to urge it on her, this fine diplomatic move has failed, except as it enables the Turkish party in European diplomacy unjustly to throw upon Servia the blame of protracting the struggle.

The Pashas have shown themselves not so good at diplomacy as at fighting, because of the limitations of their moral understanding. As they do not share the moral convictions and standards of other European nations, they of course could not foresee the vast injnry they were to inflict upon themselves by their wholesale atrocities in Bulgaria and elsewhere. But so far as they do understand the public opinion of Europe, they do, with some help from their English mentors, know how to address their policy to the demands of that opinion. And it is not to be forgotten that during the present war the Turks have displayed no ordinary ability as soldiers. Russia will have no easy access to Constantinople; for never since the first conversion of the Ottoman race, perhaps never since the times of the early Caliphs, was the enthusiasm of the Mohammedan nations for their creed so powerful as at present. The great religious, *i. e.* military revival which has been going on over nearly all Asia, will make itself felt in the coming struggle, if there is to be one. The Asiatic recklessness of life will be raised to its highest potency by the religious conviction that death for Islam ensures immediate entrance on the most exalted joys of paradise. And the Christian populations still under Turkish rule will suffer most dreadfully. The alternative of circumcision or the sword will probably be the only choice left them. For the evil spirit will not be cast out without prostrating and rending its victim in going. Already the *softas* who rule the populace of Stamboul are threatening to raise the green flag of the *Jihad*, or crescentade.

THE wide-spread agitation which has been convulsing England with regard to the Eastern policy of the Tory ministry, culminated in a deputation from a monster meeting in London, which sent up to the Government a deputation headed by the Lord Mayor. The Premier evaded meeting them; but Lord Derby, who is Secretary

for Foreign Affairs, heard what they had to say, and made a reply which is of importance as indicating exactly how far official England may be expected to go in compliance with the express wishes of real England. He was equally opposed to non-intervention and to forcible intervention; to the latter on the ground that no power, not even Russia, would give help, while one would be actively hostile. Nor could he see his way to demanding any sort of political autonomy for the three provinces; nothing could be secured from the Porte but some sort or degree of local self-government, whose guarantees he confessed it would be difficult, if not impossible, to enforce.

It is not to be wondered at that the Deputation voted that these explanations were unsatisfactory, and the agitation must go on. It has brought Mr. Gladstone more and more to the front as the true leader of the English people, and is helping all classes to discern the difference between him and the political mountebank into whose hands they have given themselves. His refusal to treat the matter as a mere party question, beginning with his request that men of all parties be asked to hear his great speech at Blackheath to the people of Greenwich, has given tone to the whole agitation. Speaking for the Liberals to the Ministry, he says: "We are willing and desirous that there should be no change of Government, if you will do your duty. But we cannot stand the continuance of your policy on this question. We don't want you to go to the wall and to the winds. But if you will not change that policy, to the wall and to the winds you must go." The premier's only response to all this protesting, is a candid avowal that he does not agree with the nation, and does not mean to do the nation's bidding in this matter, to which he adds much coarse personal abuse of Gladstone and other Liberal leaders, whom he actually describes as "worse than the authors of the Bulgarian atrocities." In any other mouth such language would be monstrous and unpardonable; but it must be remembered that the ex-novelist has given us no reason to believe that he holds the authors of those atrocities in any especial abhorrence, or has had his sympathies more excited by the sufferings of their victims, than—as John Bright puts it—they would have been on his hearing of "a sudden massacre of the dogs that prowl the streets of Constantinople." In N. P. Willis's *Pencillings by the Way* (London, 1835,) he tells of hearing from the lips of young Disraeli

a description of "an impalement he had seen in upper Egypt," and says that "the circumstantiality of the account was equally horrible and amusing," and it seems that this "amusing" method of disposing of prisoners is that now affected by the Turks on Servian territory. Several independent and unimpeachable authorities assure us of the fact, and it seems that even women near their confinement have been among the victims.

THE British Association's Section of Anthropology was the scene of a somewhat exciting discussion, which illustrates the curious unwillingness of most scientific men to even listen to the evidence of what is unusual and inexplicable in the action of the human mind. Prof. Barrett, a young physicist, trained under the eye of Prof. Tyndall, read a paper stating some curious experiences and experiments of his own in regard to clairvoyance and what is called spirit-rapping. There was nothing new in the paper—nothing in its inferences which had not been pointed out long ago by Count Agenor de Gasparin in his *Science and Spiritualism*, a book written to refute the pretences of our spirit-mongers by one who possessed all their exceptional powers, and who was able to surpass their wonders by his own, as Moses surpassed the magicians of Egypt. The chief significance of the paper was that it was the testimony of a man whose powers of scientific observation had been carefully trained. It contained none of the inexplicable but "fishy" stories told, none of the rash inferences drawn, by Mr. Crookes and Mr. Wallace, both eminent men of science, but believers in spiritualism. It simply said, "There is something in these strange performances, I am convinced." But Dr. Carpenter and some others treated the writer and his paper with lofty disdain, refusing even to take into consideration any evidence on the subject, unless all these things could be repeated before a full section of the British Association. Whether he will do the same with the reports of the Transit of Venus, when they are completed, remains to be seen.

Science has been laboring for a long time to disprove and obliterate all the lines which are supposed to run through the natural universe, declaring all such demarcations to be mere conventional horizons, devoid of scientific or objective truth. But Dr. Carpenter and most of his brethren refuse to hear anything in disproof of the validity of the lines which are conventionally supposed to circumscribe human perceptions and volitions. The facts presented by

Prof. Barrett, and the residuum of fact in the reports of Messrs. Crookes and Wallace affect those lines, and nothing more.

THE dust of the political conflict in the West has cleared away, and discloses to us as the result a drawn battle. The October elections in Ohio and Indiana have not decided how the November election will go. Had the Republicans carried both States, they could have done without New York; but since the Democrats have carried Indiana, and will probably do it again in November, all now hangs upon the vote of New York. If Mr. Tilden's own State supports him as Ohio has supported Mr. Hayes, then his election seems certain. As the *Tribune* says, in an outburst of candor, "There is a good deal of bluster on the surface, but both sides realize that it is an uncomfortably clear case of nip and tuck."

On the other hand the Western elections do seem to indicate revival of popular confidence in the Republican party, or at least a popular conviction that with all its faults it is not the worse of the two. In each of the two States the Republicans have won back four Congressmen from the Democrats, and if a similar change takes place in other northern States, the Democratic control of the House will end with the present Congress. The experiment of electing a Democratic House by the votes of dissatisfied Republicans, to keep a Republican Senate in check, has not been a success.

The Indiana defeat is ascribed by some Republican papers to the loss of the votes of those who supported the Greenback candidates, as they are called. Up to the October elections it was confidently pronounced that the two parties were equally represented in that camp, although every prominent man who supports the Cooper and Cary ticket comes from the Republican party, while the most decided Soft Money men in the Democratic ranks have made their wry faces quietly, and are supporting Mr. Tilden. The organization of a third party, in the manner adopted, was a great mistake; but it was a very natural proceeding on the part of those who had been treated with such contemptuous abuse as has been heaped upon the believers in Soft Money by every prominent organ of the Republican party. It is but natural that men should not care to remain in affiliation with a party which can find no epithets too coarse to throw at them, and which politely offers them the dilemma that they are either moon-struck fools or arrant knaves. We think it probable that before the present election is over some Republican editors

will make the discovery that a man may believe in confining the power to issue paper to the national Treasury without being either a thief or a repudiationist—or, worse than either, an inflationist; and that a belief in a reconvertible bond as the best instrument for funding our superfluous currency does not prove that he who entertains it is *non compos mentis*. This change of mind is especially probable in view of the display of the strength of the third party made in its State Convention at Albany. Probably it is relatively strongest in Indiana, where the Greenback candidate for State Treasurer received over 16,000 votes; but the coming election in the Empire State will be one in which neither party can afford to throw away votes, and almost every vote for Messrs. Cooper and Cary is a Republican vote thrown away.

THE Democrats, as was expected, have carried Georgia and West Virginia, the former by a very large, the latter by the usual majority. The smallness of the Republican vote in Georgia is ascribed by many of the Republican papers to terrorism exercised upon the voters and frauds in counting the votes. The much more probable solution is that the Republican party of that State is wholly disheartened and disorganized, and, in the absence of any prospect of success or of any incitement from the North, has made no effort to poll its whole vote. It had nothing to gain by taking any trouble, and its opponents had as little to gain and much to lose by any act that could be used against them. Terrorism or fraud on the part of the Georgia Democrats would be too gratuitous.

The real surprise of the campaign has been the Republican majority in Colorado. This new State while it was a Territory last year went Democratic; but at this, its first State election, it has given the Republicans two Senators and a member of the House, and also its three electoral votes, as the Legislature chooses the electors. For a time the Democrats very naturally refused to believe the returns, nor have they as yet discovered any explanation of this change of party.

THE condition of affairs in South Carolina is by all trustworthy accounts a very bad one. Governor Chamberlain, who it must be remembered was elected by a combination of the best elements of both parties, has called for the assistance of the national authorities to preserve the peace of the State. It is charged that the white

people all over the State have organized as rifle-clubs, with the view, it is alleged, of terrifying the negroes into staying away from the polls. And instead of waiting the coming of election-day, the explosive South Carolinian temper has broken out already. A series of outrages not unlike those perpetrated by the Ku-Klux bands are reported as having taken place in districts where the negroes are not likely to offer resistance. In some quarters, it is said, the negroes dare not sleep in their huts, but pass the nights in the fields and woods. In other places collisions occur between the two races, and the story is usually so reported by the telegrams as to make out the negroes unprovoked aggressors upon the rights and persons of the white minority.

This account of the condition of the State is so inherently probable and natural, that we see no ground to doubt its truth. In view of all that we know of the white people of South Carolina, their position as a State under the control of the negro element, when their less haughty neighbors of their own race have secured the control of their respective States, must be maddening to the last degree. Without shutting our eyes to the hardships of their position, and while heartily regretting the Reconstruction policy which brought it about, we cannot but regard both the Governor and the President as thoroughly in the right in using every means at their disposal to secure to the negroes every right which is theirs by the laws of the land, and to inflict condign punishment upon every transgressor of those laws. And the effect of their action upon the coming campaign should not be taken into consideration for an instant. This should not be a party question. We ought to see—as would be the case in England—every organ of both parties uniting in the demand that the negroes of South Carolina be protected; instead of the organs of one party making political capital out of Southern passions, and those of the other seeking to throw discredit upon the best-authenticated reports of these outrages. Nothing so marks the inferiority of our political morality to that of England as the smallness of the number of subjects in regard to which our newspapers and partisans of both parties act together, and their insensibility to motives which rise above those of partisan success or defeat. We seem to be drifting into the unhappy condition of France, whose parties agree in nothing but mutual hate, each being quite willing to secure its own success, if need were, by foreign aid.

THE nomination of Judge Hoar for Congress, in the Salem, Mass., District, by an irregular Republican Convention, and his acceptance of the nomination, deserve the applause of all patriotic Republicans, *i. e.*, of all who desire the honor and welfare of their country more than the success of their party. Hardly any two candidates that could be selected from the prominent men of New England stand in such marked contrast to each other on all the points that concern the difference between a good man and a bad one; while in regard to intellectual qualities they are not far from equal, but with great unlikeness. Both have abundance of the shrewd mother-wit of the Down East, the grasp of fact and reality, the readiness for emergency and the adaptability to difficult situations, which characterize the Yankee. But the intellectual qualities of a man cannot but be modified by the reactions of his moral nature. It makes some difference whether a man has spent the best years of his life in doing his duty, and seeking the truth, or in learning what sort of claptrap will best win him verdicts and votes.

We fear from the reports, that Judge Hoar has but little chance of election. At any rate, his candidacy will help party managers to understand that there are limits to the patience of those who adhere to the party but have not sold themselves into bondage to the small men who pull its conventional wires. It is one step to the redemption of the party from the disgrace inflicted upon it when only a single member of the State Convention—Rev. James Freeman Clarke—had the courage to declare that whether Gen. Butler received the nomination for Governor or failed to receive it, he would not vote for him.

IT is to be hoped that the next Presidential election will see some changes in both the law and the popular methods of choosing our chief magistrate. A direct choice by the whole body of electors instead of by the States would be a good riddance of cumbersome machinery, which now serves no use except to help to keep us from feeling ourselves a nation. An election for ten or twelve years, instead of four, would be another great gain, both in increasing the importance of the office and thus forcing the people to take more thought as to the quality of the man, and in diminishing the enormous cost in time, money and temper, of our political system.

On the other hand, the substitution of nominations by conventions

of our most eminent citizens for those by our regular party conventions, would be an improvement. If we must have nominations if there be no way of submitting the candidates to the preliminary votes of the members of each party, the nomination by the real rather than the formal representatives of the people would be preferable. As our readers know, we were not in sympathy with the Fifth Avenue Conference which met last May in New York to promote Mr. Bristow's chances of a Republican nomination. Mr. Bristow never commanded our respect or confidence, and we have been greatly confirmed in our distrust by the pretty full disclosure of his relations with his superior and his inferiors in office, which has been made since his resignation of his place in Gen. Grant's Cabinet. But we thought then, and have not ceased to think since, that that Conference missed a great opportunity in not placing Mr. Bristow in nomination for the Presidency, with a Democrat in the second place on the ticket, and with a platform on which all who regard the Civil Service as the root-mischief of our politics could have heartily united. It would then have been possible to present to the people a candidate not in affiliation with either party, and for whom they could vote without perpetuating the partisan control of the Government. Such a movement might not have succeeded the first time, but such a convention would not need the immediate success of the next election to carry out its plans. It could afford to wait for more than one election in the hope of finally economizing our resources, purifying our government, and calming our elections forever, by securing permanence in office to every office-holder outside of the Cabinet, the Military and the Diplomatic services.

But as matters now stand, we cannot see that there is much ground of hesitation for those who hold such views. On one side is an honest, straight-forward soldier, who pledges his word that he will do his utmost to carry out every feasible reform in this matter. On the other is an experienced politician, whose letter of acceptance contains *not a single pledge on this or any other point,* and who, if elected, will begin his Administration by removing from office every man of experience now in the Civil Service. To those who "belong to" either party, this may seem the most natural and proper thing for Mr. Tilden to do. Even the party opposed to him will hardly feel any real objection to conduct exactly such as they themselves would have adopted, if they had been in his place. But

to those who "belong to" no party, because they belong to truth and to their country, such conduct cannot but seem as wilful and wicked a waste of the nation's resources as any squandering of the moneys in the national treasury would be. The nation has as much right to profit by the experience of those who have spent years in her service, as she has to the duties levied in her custom houses; and our whole system must be altered to prevent this wilful destruction of what is national property, though of an intangible sort.

THE wonderful success which has attended the Centennial Exhibition is indicated in the attendance of greater numbers than ever were brought together by any of the European Exhibitions, although each of them had a hundred millions of people within easier access than is now open to our neighbors across the Alleghanies. From Vienna to London is about as far as from Philadelphia to Indianapolis; and if with this line a circle be described around the two Exhibition centres, the population included within the European circle will be found immensely the greater. Yet on no occasion was the number of persons collected at the Vienna *Ausstellung* at all equal to the vast number assembled at our own Exhibition. As it is a New York newspaper that says it, we of Philadelphia may fairly pride ourselves upon this great success as partly owing to the way in which the people of our city have treated their visitors. Much more of course is due to the actual merits of the display, which seem to put every visitor into the mood in which the Queen of Sheba returned from her visit to the court of Solomon. We have yet to hear of a single person who was not surprised and delighted by its vast variety, while of course it has defects of detail and of arrangement which could hardly be avoided in the first Exhibition of the sort on this continent.

Public opinion has been very greatly divided as to the wisdom of keeping the Main Building intact for a permanent exhibition; and the Commissioners of Fairmount Park, we think, would have had the majority with them whichever way they finally decided the question. Its present site in front of Memorial Hall is, of course, very much against the proposal; but still there is reason to rejoice that it is to be retained for a permanent exhibition for the education of the people of our city.

ON SELF-FERTILIZATION AND CROSS-FERTILIZATION IN FLOWERS.

DURING the past year I have conducted a series of observations and experiments to throw light on the inquiry whether insects are any material aid to plants in fertilization; and the result has been to convince me of the truth of the negative reply to this question.

Insects sometimes fertilize flowers, and cross-fertilize them; but I believe these cases are less frequent than they are supposed to be, and that when they do occur, they have no bearing on the general welfare of the race. In other words, such fertilization is of no material aid to plants in the progress of the species.

The position of those who take the other side is this: All plants with brilliant colors, with fragrance, or with honeyed secretions, have these attractions for the purpose of enticing insects, which unconsciously bring pollen at the same time, and thus fertilize the flower. The proof of this is thought to lie chiefly in the fact that many plants do not perfect their stamens and pistils at the same time; are placed in relative positions in which it seems difficult, or even impossible, that they should have any influence on each other; or in some other way present apparent obstacles to sexual union. From this it is assumed, and not from any actual experiment that I am aware of, that plants abhor close breeding.

That plants abhor close breeding is an idea borrowed from a supposed experience in the higher animals. But the comparison is not fair. In the higher animals the idea of sex is essential to the perpetuity of existence; but it is not so in plants. They reproduce themselves by bulbs, tubers, suckers, offsets, buds, and, in the lowest organisms, by simple cell divisions. Propagation in plants, as an idea, is entirely independent of sex. True, many of our forest trees have none of these accessories—even the skillful horticulturist can scarcely graft some of them; and then there are annuals which depend wholly on seeds—a product of the sexes—for perpetual existence. But there is not one that I know of that a horticulturist would say *could not* be reproduced indefinitely without the aid of seed. The red Dutch currant is an individual plant which has been reproduced by cuttings long anterior to modern history; and, I

believe, the Canada thistle, couch grass, horse-radish, and numerous other plants, could be continued for countless ages by their running roots alone. Now this is as close a kind of breeding as could come through the operation of separate sexes, and for which no analogy can be drawn from any experience in the higher forms of animal life. We can see that seeds in plants favor the distribution of species, and enable them to maintain existence for a longer period than mere plants could. Sex in plants may be a factor in the evolution of form; but those who have kept pace with botanical knowledge, and are familiar with what is known as *bud variation*, will not lay much stress on the absolute necessity of sex to this end in vegetable nature. I believe I am safe in saying that there is nothing whatever known to prove that there is any physiological benefit to plant races by the establishment of the sexes. Some have thought that the varieties of apples wear out in time; but even this is being argued on both sides by the most distinguished horticulturists; and I may say that I have seen at the recent Centennial Exhibition as fine golden pippin apples, the kind used to illustrate the theory, as Mr. T. A. Knight thought were only seen in his younger days.

We must then lay aside all considerations from analogy or inference, of the benefits of cross breeding, even though we should find that all plants discarded their own pollen. There may be some other reason, quite independent of any sexual consideration; and it is because I believe there are other reasons in dicœcious, moncœcious, and other cases, that I take the stand I do.

We may note, in the first place, that insects visit some anemophilous plants as freely as they do the entomophilous ones. They, for instance, abound on the male flowers of the willow, especially *Salix caprea*, which have abundant honeyed secretions: but they avoid the female plants. If honeyed secretions be for the purpose of enticing insects for cross-fertilizing purposes, how is the object attained here? This single instance is enough to enable us to say decisively that honeyed secretions are not mere traps to allure insects for fertilizing purposes, for *Salix* is fertilized by the wind.

Then there is *Yucca*, of which so much has been made. In my district, *Yucca filamentosa* abounds. It opens its flowers about the 25th of June. In 1875 a plant of *Yucca augustifolia* blossomed on the 5th of June. Though closely watched, I found no *Pronubas*

about them. They produced no seed. The *Yucca filamentosa* had numbers, and seed abounded. About the 5th of June this year, the *Yucca augustifolia* again opened its flowers. On the 12th I noticed the *Pronuba* to abound, and I hoped for seed. There were from 1 to 5 in each flower. On the 19th I noticed that the flowers had almost all fallen fruitless. I then placed some pollen on four of the flowers—each had pollen from its own flower—and these produced the only seeds the plant bore. Even when fertilized at all by insects, I am sure the fertilization is from the pollen of the same flower. My experiment shows that its own pollen is acceptable to it. It is true it is difficult to understand why the plant seems unable to fertilize itself without extraneous aid; but it is clear that this is not from any abhorrence of its own pollen, or from an especial desire for insect aid, especially the aid of an insect whose chief mission seems to be to prey on the fertilized seed!

The chief arguments for the necessity for insect fertilization are drawn from structure, and not from facts of observation. For instance, we are told that *Iris*, *Campanula*, Dandelion, Oxeye-daisy, the Garden Pea, *Lobelia*, Clover, and many others, are so arranged that they cannot fertilize themselves without insect aid. I have enclosed flowers of all these named, in fine gauze bags, and they produced seeds just as well as those exposed. I was somewhat surprised that the two first, *Iris Virginica* and *Campanula*, should produce seeds under these circumstances, as they are common illustrations of the supposed necessity of insect fertilization.

In short, in all the cases that I have tested in this way, seeds were produced as well under the gauze as outside, except in one instance; *Baptisia Australis*. In most Papilionaceous plants that I have examined, in spite of the suggestions of my friends, I thought the arrangements favored self-fertilization,—not only by the position of the organs, but from the fact that the moment anything touched the flower, so as to liberate the pistil or stamens, a quantity of pollen floated all around like a little cloud,—a disposition of the pollen which, by the way, in view of prevailing theories, the class of flowers with "fragrance, color, or honeyed secretions," ought not to make. *Genista Scoparia* will give an excellent illustration of this. But in *Baptisia* I did not notice this little cloud, and it did seem that in the actual act of collecting honey, the humble-bee's abdomen, covered with pollen, pressed itself closely down on the stigma.

I covered a spike of a dozen unopened flowers with a gauze bag, and had only one seed vessel, though in the exposed spikes nearly every one perfected. This fact may go for what it is worth; for, be it remembered, I do not deny that flowers are sometimes fertilized by the aid of insects. It is with the extent of this fertilization, and the theories to be deduced from it, that I have to deal.

Independently of trials by bags, I have experimented with single flowers of some species. I take plants of which there are no others in the vicinity, and pick off all but a solitary flower, not permitting another to open until this has faded; therefore, if this flower seeds, it must be only by its own pollen. I was led to try this from noting that a few first flowers of *Œnothera serrata*, which open about noon and die in a few hours, seeded when I was almost sure no insect had visited them. In watching for this purpose *Talinum teretifolium*, I found that it opened always a few minutes before one p. m., began closing at three, and by half-past three had wholly closed. No insect visited it in that time; but every flower seeded, as did subsequent experiments with single flowers. An ally, the common purslane, I believe remains expanded a less time, and is I think an undoubted self-fertilizer; and yet on what theory of the advantages of cross-fertilizing could a plant make better headway through the world?

It is of course well known that some flowers open and close at almost all hours of the day and night, many remaining open but a very short time. Can this varying and limited time have anything to do with insect fertilization? Would not fertilization by insect aid be more certain if at least a whole day were given for the chance? In my district the little florets of the common chicory are all fertilized before eight o'clock, and by nine have faded away. This species is an excellent one for noting how self-fertilization is effected in composite plants, as the pistils are blue, and the pure white pollen is easily seen. Soon after daylight the corolla lengthens. After a little while it rests, but the stamens and pistil go on. After a while the stamens cease, but the pistil continues to lengthen, carrying an immense quantity of pollen with it. Here is the difficulty which those who differ from me experience. The pistil has to cleave, and only on the interior of the clefts seems to be the stigmatic surface; the pollen then must be—*must* be, it is said—only on the exterior where it cannot operate. But if any one will get up early and spend a couple of hours in watching the development of the flower,

driving away an occasional sand-wasp that would like to gather the pollen, he will find that there is not a cloven pistil that has not some pollen on the interior stigmatic surfaces. Of what avail are "must be's" against positive facts like these? But if he watch closely he will see that the pollen falls into the chasm made by the opening stigmas. In the language of my friends it is a "beautiful arrangement" for insuring self-fertilization. If, further, we allow the sand-wasps to work at pollen-gathering, we find that while clearing the pistils of pollen they push quantities into the clefts, and are therefore agents in self-fertilization, instead of the reverse. I have observed the same in Dandelion and the Oxeye Daisy (*Chrysanthemum leucanthemum*) as well; and am sure that thousands flower and perfect seeds that no insect visits. I am *not* sure that the idea that pollen must always enter at the apex of a stigma or nowhere, in order to effect fertilization, is correct. In *Cirsium* (*C. Pitcheri*) and many others of that section, what in others is a bifid stigma is almost entire, the stigmatic surfaces being almost or probably in some cases wholly united together. *Cirsium Pitcheri* has very long pistils. The honey-bee seems very fond of the flowers; it works between the pistils. I have never detected a grain of pollen on the almost entire apex, though the sides are covered as in other composites. But it seeds abundantly.

I think the peculiar closings of flowers might be said to be as much designs for effecting self-fertilization, as for anything else. It does effect it in *Ranunculus*, *Claytonia*, and most likely in the *Iris* enclosed in the gauze bag; and perhaps in many plants with flowers that close and twist up in fading. In *Ranunculus*, on the first day's opening of the flower, the outer of the numerous rows of pistils throw their pollen on the glazed petals. These close at night, and the pollen is dropped in over the hollow in which is the mass of perfect pistils (I refer to *R. bulbosus*). In *Claytonia* (*C. Virginica*) the same thing occurs with the early flowers, so far as drawing the stamens up to the pistils is concerned. In the later flowers the anthers recurve more, and in the closing at night are drawn under the pistils, and hence we find seed in these plants only from the earliest blossoms. These illustrations are not uncommon. Even in wind-fertilizing flowers, the times of opening and closing of certain parts of the flowers may be worth a study. I find *Luzula campestris*—the wood form—bursts its anthers about 9 o'clock a. m. By ten the pollen is committed

to the atmosphere. As its own pistil has dried up by this time, having expanded two days before, it cannot fertilize itself. There is no evidence that it would not be just as well if it could. This precision and uniformity as to time show that there are other considerations involved in the acts connected with fertilization, besides those usually suspected. This brings us to the question of Dichogamy as an agent.

Much stress is laid on the fact that in many flowers the pistil is mature before or after the stamens, and this is interpreted as an especial arrangement for cross fertilization. I pointed out some time ago that this difference in time varied with the season in many species. But the difference is striking in some closely allied species. *Barbarea praecox* and *B. vulgaris*, two cruciferous plants, are so nearly related that the difference can scarcely be defined. The former, however, has its pistil of about equal length with the stamens—all included in the petals. The stigma certainly receives its own pollen simultaneously with the expansion of the petals. But in *B. vulgaris*, the pistil protrudes beyond the closed petal, and in perfect condition to be fertilized by extraneous pollen before it can be served by its own. But both species make their way equally well through the world, and I think no better illustration could be offered of the fact that a dichogamous plant has no advantage in the struggle for life. This fact may, however, be illustrated in various ways. Supposing the *Iris* could not self-fertilize. Its next of kin, *Sisyrinchium*, is certainly a self-fertilizer; and who will say that it has not made its way proudly? *Iris Virginica* is comparatively local, but any student can get a specimen of *Sisyrinchium Bermudianum* at a few hours notice. You can find flowers which seem to forbid self-fertilization, it is true; but let us not close our eyes to those so constructed as to render insect aid impossible. There are some *Scrophulariacous* plants which have the pistil arranged above the stamens, so as to seem placed there in order that a visiting insect may rub its pollen-covered back against it on entering; but many *Pentstemons* (*P. grandiflorus*, *P. Cobaea*,) incline the pistil downwards, making any such insect fertilization very difficult, yet every flower perfects seeds. *Browallia* (*B. elata*), has a hairy cap over the stamens, and an insect would only aid in self-fertilization. But *Browallia* is not visited by insects, yet seeds abundantly. It might be argued, this is because it

has no fragrance; but there are some garden *Verbenas* which have fragrance as well as color. No insect visits them on my grounds, so far as I can discover, but both kinds seed equally well.

In fact this idea that color and fragrance are necessary to attract insects—are given to plants for that purpose—receives a great blow from the fact that flowers with neither are thronged with insect patrons. Many species of *Rhus* are illustrations. But I have taken especial pains to note *Rubus occidentalis*, our native black-cap raspberry. It has not the faintest trace of odor. Its small, greenish-white petals are so inconspicuous that it might as well be apetalous. But nothing can exceed the fondness of the honey-bee for it. It abounds in my vicinity, and from sunrise till far into the twilight of evening the honey-bees crowd on it. They neglect every other flower, even white clover, as long as it lasts. Surely there should be a necessity for insect fertilization in cases where insects are so assiduous! I have had this point suggested to me. Is it not a surprise, then, that although a gauze-bag was thrown over a cluster of flowers, yet a perfect fruit resulted to every blossom—as was the case with all the neglected clover flowers as well? As to clover flowers, so great is the faith in the necessity for insect fertilization, that humble-bees have been sent from England to New Zealand to help the clover along. But since last season, I have discovered that our humble-bees do not enter the mouth of the red clover—care nothing for the elaborate arrangements for cross-fertilization—but slit the tube and get at the honey from the outside! And yet the clover seeds abundantly; and, so far as I could see, every flower in the field where I saw the bees behaving so outrageously, bore its seed. Many flowers are served in this way; and unless one looks closely, he may be deceived. In the Persian lilac, if we follow the course of our friends of the insect-fertilization school, we see the stamens arranged above the pistil, and, as the pollen bursts simultaneously with the opening of the corolla, it ought to fall on the pistil, and the entrance of an insect would only aid this self-fertilization. But, with us, it never yields a solitary seed, and we may be asked to "behold the results of self-fertilization." But we see exactly the same arrangement in the common lilac, and that seeds abundantly. In both cases the humble-bee slits the tube, and the honey bee either follows in the slits made by its stronger friends, or else makes slits for itself, a point I have been unable positively to determine.

Indeed, one of the points I wish to insist on most strongly is, that the facts in this question have been but imperfectly observed, and then erroneously construed; and of this I will offer but one more illustration. It relates to dimorphous flowers, those with the pistils long in some flowers and short in others, as in *Epigaea*, *Mitchella*, *Houstonia*, and others. When we look at the allies of these plants, we notice that this behaviour is exceptional. It may be assumed that they have wandered from a condition where the separate sexual organs were nearer to a perfectly hermaphrodite character, and it is assumed that this wandering is in order to derive some benefit from cross-fertilization through insect agency. I have endeavored to test this assumption in *Houstonia coerulea*. I selected a number of plants of both forms, and marked them when in flower. In some clusters, aggregating about fifty flowers of the short-styled plants, and which I have no doubt were self-fertilized, *forty-two* perfected seed; but of fifty with long styles, and which would necessarily have more difficulty of availing themselves of their own pollen, only five matured seed. Thus we see that the self-fertilizer has at least the advantage of numbers; and in a battle for life, or for any purpose at all, that is surely an advantage of no mean importance.

I believe I have shown that the facts are not wholly as they have been represented; and that even when they may exist as represented, they do not justify the deductions sought to be drawn from them.

Hasty generalizations as to the purposes of nature are dangerous. If, for instance, we examine swampy places, we find magnolias, willows, white cedars, red maples, cypresses and numerous others growing therein. We at once conclude that they grow there because they prefer the wet to the dryer land. But a wider acquaintance with these trees will show that all of them do better when, as we often find them, growing in dryer places. A suspicion then arises that there is something wrong with our reasoning, and we find at last that nature has a deeper purpose than merely an individual regard for these trees. Their seeds will only grow in wet soil; and of necessity, and not for individual benefit, have these trees to remain there. Again, I think there is nothing more certain than that effects will continue long after the causes which produced them have ceased to exist; so that actions which you see, may be associated with degradation instead of evolution—may be the last flickerings of

a dying light, and not an aurora indicating the birth of a new day. As to the present question, our reason will tell us that the phenomena we see may bear this interpretation as well as that given to them by the advocates of insect fertilization. In Europe, for instance, the common strawberry is almost universally hermaphrodite; but in this country the tendency to dicœcism is well known. We know also that those parts of the world in which dicœcism prevails are not as favorable to the existence of the strawberry as the others; and we may safely conclude that dicœcism—a form of dimorphism—has no relation to any advantage to be derived through the sexes, but is an actual result of degrading conditions.

Then, physiologically, what good can result from cross-fertilization? It is asserted that probably most of the large order of composites are cross-fertilized, the flower in one head receiving the pollen of another flower in the same head by the aid of insects. This is contended from examination of the structure. After noting the behaviour of the parts, and in the absence of insects, I contend these plants are self-fertilizers. But admitting all that is claimed for them, compare one with an ordinary polypetalous flower, say *Ranunculus*—and where is the gain? The floral parts are all on the same common peduncle in both cases, and the stamens and pistils are as widely—nay, more widely—separated in a *Ranunculus* than in a dandelion. Practically, there is a wider separation of the sexes in the *Ranunculus* than in the dandelion, granting even all that or more than is asked for cross-fertilization in composites.

Physiological disturbances that aid the vital principle in the pistils, and interfere with that of the stamens, of course weaken the vital power of the pollen. In such cases, foreign pollen—pollen from flowers free from these disturbances, or where the disturbance favors the stamens instead of the pistil—would have more potency. It is, therefore, not surprising that some cases should offer, proving foreign pollen more potent than own pollen. It would be more surprising if there were none, for in every direction we find nature with overflowing abundance pushing beyond what we regard as the necessary mark. As the boy who, to jump across the stream, first goes back, and when he lands on the other side, goes farther than he wants to; so does nature in all things, or I have not read her story right.

I cannot refer in a brief paper like this to more than a few of the

observations I have made, nor do I think it necessary. I submit these propositions:

1. That cross-fertilization by insect agency does not exist nearly to the extent claimed for it.

2. Where it does exist, there is no evidence that it is of any material benefit to the race, but to the contrary.

3. Difficulties in self-fertilization result from physiological disturbances that have no relation to the general welfare of plants as species.

THOMAS MEEHAN.

THE POETRY OF THE PICTOR IGNOTUS.[1]

THE readers of Henry Crabbe Robinson's *Diary* will not easily forget the strange fragments of conversation he records as displaying the character and the thoughts of his artist friend, William Blake. And those who have the good fortune to own, or even to have looked into Gilchrist's *Life of Blake*, will carry away from that book and its weird illustrations impressions they would not gladly lose—impressions of the simple, pure-hearted, inspired child of genius, who beat about a prosaic world like a seraph that had lost its way, and then died misunderstood and slightly cared for. The *pictor ignotus*, as he loved to call himself, was the most un-English of Englishmen. More even than Milton, he reveals possibilities in the English character that no one had ever dreamed of. In one of his "Proverbs of Hell" he says, "The fool sees not the same tree that a wise man sees;" and certainly he saw nothing with the same eyes that his contemporaries did. His measures of magnitude and of weight were so utterly different from theirs—so different, though perhaps in a less degree, even from ours! His piety and his seeming impieties, his ability and his limitations, were both as far as the poles from anything of the same sort to be found in England at the close of the eighteenth century. Only Hamann of Koenigsberg, or Blake's friend Flaxman, or Flaxman's master Swedenborg, comes into any sort of comparison with him. He reminds

[1] THE POETICAL WORKS OF WILLIAM BLAKE, LYRICAL AND MISCELLANEOUS. Edited with a Prefatory Memoir by William Michael Rosetti. Pp. cxxxiii, 231. 12mo. Boston: Roberts Brothers.

you now of Böhme, by his visionary audacity; now of Gœthe, by the astuteness of his insight; but he is always himself, and every stroke of his burin or of his pen conveys with it a subtle but unmistakable flavor of the man and his thought. Men have called him insane; even his latest editor thinks "there was something in his mind not exactly sane." But this notion arises from the fact that he possessed the highest and most exalted powers of the mind, but not the lower. He could fly, but he could not walk; he had genius and inspiration, without the prosaic balance-wheel of common sense. Hence his defects of utterance to our ears; he is incoherent in his effort to make known to us what he sees, for very slight and imperfect is his acquaintance with our daily speech, and with the everyday, commonplace thought it represents; and for this reason much of his best power has been wasted, so far as any access to the general mind is a test of success. The artist, the poet, the thinker, the man of high culture, delight in his work, both literary and artistic; but only the unprejudiced, the open-minded and the patient among readers in general will value him at his true worth.

Blake died in 1827 in his seventieth year. He had studied engraving under Basire, and followed it as a profession throughout life; but he also painted in water colors. At the age of sixteen, he began his public career as a producer of engravings, and already betrayed the bent of his mind by praise of Gothic art and of the Middle Ages, a thing unheard-of at a time when men of such refined sensibility as Goldsmith possessed, saw nothing in York Minster but a pile of barbarous rudeness. He lived scantily and hardly. Among artists, he contracted a capricious friendship for Stothard, Flaxman, Fuseli; but he detested Reynolds and the other magnates of the R. A., only less fiercely than Raphael, Rubens and Titian. In his twenty-sixth year he married a wife of so little education that she had to make her mark in the parish register; but she believed in him, grew in mind under his influence, and became the best possible help to him. Both believed that his pictures were what, to the eye that sees them for the first time, they confessedly seem to be, viz., visions transferred to the canvass or the plate. He was a thorough idealist: "I assert for myself that I do not behold the outward creation, and that to me it is hindrance, and not action. 'What!' it will be questioned; 'when the sun rises, do you not see a disc of fire somewhat like a guinea?' 'Oh,

no, no! I see an innumerable company of the heavenly host crying, Holy, holy, holy, is the Lord God Almighty.' I question not my corporeal eye, any more than I would question a window concerning a sight. I look through it, and not with it." A young artist, on finding the springs of inspiration dried up within himself for a fortnight together, went to Blake for comfort, and found him sitting at tea with his wife. After hearing his complaint, Blake turned suddenly to his helpmate and said, "It is just so with us—is it not?—for weeks together, when the visions forsake us; what do we do then, Kate?" "We kneel down and pray, Mr. Blake."

His quality as an artist does not properly concern us here, but we may be excused for quoting what his editor, a most competent critic, says of it: "Blake's splendid, terrible and daring imagination was embodied with equal force in the art of design and in that of poetry. 'Execution,' he has said, 'is the chariot of genius;' and never did that charioteer reveal himself in more unmistakable guise, than in the handiwork of Blake. To see one of his finer tempera or water-color pictures, or one of his partly color-printed, partly hand-colored designs, or of his designs engraved by himself on the ordinary system, is a new experience—one that you cannot prepare for nor forestall. The mysterious meaning of the work, its austere intensity of presentment, the rush (as it were) of spiritual and vital force into all its forms, animating them with strange fires of life and frenzies of endeavor, the rapture of effort and of repose, the stress and the hush, give these works a different character from aught else. In fact, they have not so much the semblance of inventions (highly inventive though they manifestly are, in the ordinary aesthetic sense of the word) as of visions, or of revelations or intuitions. There is severity and there is beauty, each in a high degree; but what impresses the spectator most is the strength of receptivity or response in the designer—the energy with which he has clutched at the vision, the closeness of rendering with which he has imparted it to others."

During his life he published three collections of poems. The first, *Poetical Sketches* (1783), were written between his twelfth and his twentieth year; and they certainly hold a remarkable place in the history of English poetry. The school of Pope was falling into utter decay; its verbiage and its artificial flowers were losing all the lustre they ever had to boast; but the earliest productions of the

more natural school of Cowper and Burns were not yet accessible to the young poet when he wrote these *Sketches*. Yet he is nearly as free as any writer of our own century from any trace of the mannerisms of the time, while he exhibits a grandeur of imagination, and a vigor of style, which place him at once above all his contemporaries. It is of course a book of echoes, as well as of a voice. The longest piece is a number of scenes from a play called "King Edward the Third," and it shows how thoroughly he had entered into the spirit and the manner of Shakespeare. Another is "An Imitation of Spenser." Here is a "Song" which he wrote before he was fourteen years old:

How sweet I roamed from field to field
And tasted all the summer's pride,
Till I the Prince of Love beheld
Who in the sunny beams did glide.

He showed me lilies for my hair,
And blushing roses for my brow;
He led me through his gardens fair
Where all his golden pleasures grow.

With sweet May-dews my wings were wet,
And Phoebus fired my vocal rage;
He caught me in his silken net
And shut me in his golden cage.

He loves to sit and hear me sing,
Then, laughing, sports and plays with me;
Then stretches out my golden wing
And mocks my loss of liberty.

Like the others of these *Sketches*, this does not give us the full and ripe quality of the man; but who else in the year of grace 1761 was capable of such English? More mature and more characteristic of his style is his

ODE TO SUMMER.

"O Thou who passest through our valleys in
Thy strength, curb thy fierce steeds, allay the heat
That flames from their large nostrils! Thou, O Summer,
Oft pitchedst here thy golden tent, and oft
Beneath our oaks hast slept, while we beheld
With joy thy ruddy limbs and flourishing hair.

"Beneath our thickest shades we oft have heard
Thy voice, when Noon upon his fervid car
Rode o'er the deep of heaven. Beside our springs
Sit down, and in our mossy valleys, on
Some bank beside a river clear, throw thy
Silk draperies off, and rush into the stream!
Our valleys love the Summer in his pride!

"Our bards are famed who strike the silver wire,
Our youth are bolder than the Southern swains,
Our maidens fairer in the sprightly dance;
We lack not songs, nor instruments of joy,
Nor echoes sweet, nor waters clear as heaven,
Nor laurel wreaths against the sultry heat."

This was the only literary work he ever printed with ordinary type, for he had no credit with the publishers. When his *Songs of Innocence* appeared in 1787, the words were engraved in relief, with marginal designs printed in colors and then touched by hand in imitation of drawing. These, with the *Songs of Experience*, (1794) form one whole, and are in some respects the most valuable of Blake's poems. They fill together not much over a fourth of the pages of Mr. Rosetti's edition, but they contain nearly all the poems by which Blake has reached the general ear. Their great difference from his *Sketches* fully authenticates the early date he assigns to his earlier work. They sound like poems from the world's very childhood, when the wives of the Patriarchs sang their Esaus and their Benjamins to sleep in the tent's shade; and yet they are, in point both of form and of content, among the masterpieces of our poetry. Take the very slightest of the earlier collection, that called "Infant Joy," and if you think it a mere carved cherry-stone, then pray carve us such another:

"I have no name
I am but two days old."
What shall I call thee?
"I happy am
Joy is my name,"
Sweet joy befal thee!

Pretty joy!
Sweet joy, but two days old,
Sweet joy I call thee:
Thou dost smile,
I sing the while;
Sweet joy befal thee!

But his most characteristic pieces are puzzles, gorgeous in style and intricate in sense. Such is

THE TIGER.

Tiger, tiger, burning bright
In the forests of the night,
What immortal hand or eye
Could frame thy fearful symmetry?

In what distant deeps or skies
Burnt the fire of thine eyes?
On what wings dare he aspire?
What the hand dare seize the fire?

And what shoulder and what art
Would twist the sinews of thy heart?
And when thy heart began to beat,
What dread hand and what dread feet?

What the hammer? what the chain?
In what furnace was thy brain?
What the anvil? What dread clasp
Dare its deadly terrors grasp?

When the stars threw down their spears,
And watered heaven with their tears,
Did he smile his work to see?
Did he who made the lamb make thee?

In the last line, we take it, lies the key to the whole poem, whose questions all point toward the same mystery—the seeming discrepancy between the divine tenderness and the fierce products of the divine creative power.

Another and a still stranger group of poems are Blake's "Prophetic Books," a series of wild visions whose motive is hard to detect. Mr. Swinburne, in his *Essay on Blake*, has bestowed upon them especial eulogy; but to most, even of Blake's true lovers, they are and remain unread riddles, full of gorgeous imagery and mysterious allegory. In form they are hardly even rhythmical, and for this reason Mr. Rosetti has excluded all but two of them—*The Book of Thel* (1789) and *Tiriel*—from his edition of Blake's poems. From another of them named *Milton*, engraved in 1804, he reprints the preface, which is worth quoting:

And did those feet in ancient time
  Walk upon England's mountains green?
And was the holy Lamb of God
  On England's pleasant pastures seen?

And did the countenance Divine
  Shine forth upon our clouded hills?
And was Jerusalem builded here
  Among these dark Satanic mills?

Bring me my bow of burning gold!
  Bring me my arrows of desire!
Bring me my spear! O clouds, unfold!
  Bring me my chariot of fire!

I will not cease from mental fight,
  Nor shall my sword sleep in my hand,
Till we have built Jerusalem
  In England's green and pleasant land.

Besides poems of the classes we have specified, a considerable number of pieces have been collected from other quarters for the present edition. Some are reprints; many are quite new to the public. Of the former class is the "Everlasting Gospel," a "wholly amazing and partly splendid poem," which first appeared in Mr. Swinburne's *Essay*. It is in the main a poetical version of the strange, poetical Antinomianism which meets us in the conversations recorded by Crabbe Robinson, a form of thought entirely out of keeping with Blake's life, and only explained by his general incapacity to see the lower truth of law, as well as the higher truth of love. Hence his continual opposition and contrast of the things which the Apostle connects so closely, when he says, "Love is the fulfilling of the law." Blake's opening lines run—

The vision of Christ that thou dost see,
Is my vision's greatest enemy.
Thine is the friend of all mankind;
Mine speaks in parables to the blind.
Thine loves the same world that mine hates;
Thy heaven-doors are my hell-gates.
Socrates taught what Miletus
Loathed as a nation's bitterest curse;
And Caiaphas was, in his own mind,
A benefactor to mankind.
Both read the Bible day and night,
But thou readest black where I read white.

The burden of the poem is, Christ overthrows the law and all its works; and certainly he does read black where others read white in the Gospels, in order to make out his case. After telling in his own way the story of the woman taken in sin—the spurious passage which has an Antinomian look—he proceeds:

> The earth trembled and naked lay
> In secret bed of mortal clay,
> On Sinai felt the hand divine
> Putting back the bloody shrine;
> And she heard the breath of God
> As she heard by Eden's flood:—
> "Good and evil are no more,
> Sinai's trumpets cease to roar;
> Cease, finger of God, to write,
> The heavens are not clean in thy sight.
> Thou art good, and thou alone,
> Nor may the sinner cast one stone.
> To be good is only to be
> A God, or else a Pharisee."

At the close he bursts into scornful invective against the philosophic heroes of his time; but the passage is not so fine as is a shorter poem in the same strain, entitled "Scoffers."

> Mock on, mock on, Voltaire, Rousseau,
> Mock on, mock on; 'tis all in vain;
> You throw the sand against the wind,
> And the wind blows it back again.
>
> And every sand becomes a gem
> Reflected in the beams divine;
> Blown back, they blind the mocking eye,
> But still in Israel's paths they shine.
>
> The atoms of Democritus,
> And Newton's particles of light,
> Are sands upon the Red Sea shore,
> Where Israel's tents do shine so bright.

We have avoided quoting his most powerful poems, because of their abstruseness. Such pieces as "The Mental Traveler" and "Broken Love" are rather to be pored over than read; and like very much of his work, such as his Prophetic Books, they call for abundance of patient and loving exposition, such as Dante Rosetti, Swinburne, and others, have already bestowed upon them. But

even those who have no taste for mysteries will find plenty of enjoyment in his poems, and will learn to love the man for his Christlike sympathy with the humble and the weak, with the despised wild-flowers, the suffering children of the great cities, with all who are sore from the world's blows and bruises. Yet at times he can write with caustic in the ink, but it is when he pours contempt upon the idols and the masters of the day. Such are some of his "Fragments" and his "Epigrams," of which these are specimens:

Some people admire the work of a fool,
For it's sure to keep your judgment cool.
It does not reproach you with want of wit;
It is not like a lawyer serving a writ.

Great things are done when men and mountains meet:
These are not done by jostling in the street.

The errors of a wise man make your rule
Rather than the perfections of a fool.

Her whole life is an epigram
Smack, smooth, and nobly penned,
Plaited quite neat to catch applause,
With a strong noose at the end.

Sir Joshua praises Michael Angelo;
'Tis Christian meekness thus to praise a foe.
But 'twould be madness, all the world would say,
Should Michael Angelo praise Sir Joshua.
Christ used the Pharisees a rougher way.

He [Rubens] makes the lame to walk, we all agree;
But then he strives to blind all who can see.

Here lies John Trot, the friend of all mankind;
He has not left one enemy behind.
Friends *were* quite hard to find, old authors say,
But now they stand in everybody's way.

He could write sharply and bitterly of his friends—of Stothard, Hayley, and even Flaxman—and use a perverse ingenuity in ascribing to them imaginary faults. A long life of neglect and of privation had not left him unscarred or bruiseless; but it is strange that so much of sweetness was in the man to the end, and prevailed over all temptations. For this man was the *pictor ignotus*, with the con-

sciousness of possessing unrivalled imaginative powers, and the solitary capacity for artistic work of the very highest order. Only Turner, of all his contemporaries, can be compared to him; and Turner belongs to a later generation. And because he could not rise or stoop, —which you will—to the technical and conventional standards of his profession and his age, he was passed by. He loved appreciation as every sound, healthy nature loves it; but it was denied to him. Yet he was not soured or embittered by this denial, though now and then he spoke in his haste with sharp and often unjust words. He kept what he calls

> The countless gold of a merry heart,
> The rubies and pearls of a loving eye,

as treasures of which none could rob him. He lived his own life, "seeing Him who is invisible," and therefore "enduring" all adversities; for his song was ever

> I'm in God's presence night and day,
> He never turns His face away.

And therefore the world, having grown wiser, takes him to its heart at last, not to give but receive warmth. The lightest touch of his pencil or his burin is prized; and genius pores over his "dark sayings on a harp," seeking to discern the great meanings of his verse. He has become one of the great order of enigmatic seers, whose visions are clear in part only to the initiated, but obscurity itself to the profane—the order of Parmenides, Erigena, Master Eckhart, Nicolaus Cusanus, Giordano Bruno, Böhme, Saint Martin, Hamann, Baader, and, in some of their moods, of Plato, Gœthe, Hegel and Schelling.

T.

THE GREAT PLATEAU REGION.

THE country drained by the Colorado River and its affluents is a peculiar region, without its parallel on the globe. It is essentially a region of plateaus and cañons, the plateaus mainly dry and sterile, where the streams flow in deep gorges, far beneath the surface.

The longest and most northern branch of the Colorado is the Green River, which heads in the Wind River Mts., against the

sources of the Big Horn and the Snake. This stream, in its long course towards the south, receives the waters of the Uinta from the west, and the Tampa and White from the east, all considerable streams. Near latitude 38°15′, longitude 110° 0′, it is joined by the Grand, a stream of nearly equal size, which heads in Middle Park, Colorado, drawing its first supplies of water from the snow-fields of Long's Peak. It receives a number of large affluents; Williams Fork, the Muddy and the Blue in Middle Park, the Eagle, the Roaring Fork, the Gunnison and the Dolores farther down its course.

Below the point of junction of the Grand and the Green, the stream is known as the Colorado. Why this name was not given to the Green River Fork as well, puzzles the comprehension. It is the largest and longest of the two, and continues the direct course of the Colorado. The same is the case with the Missouri Fork of the Mississippi, the Jefferson Fork of the Missouri, the Snake Fork of the Columbia, and in many other cases. It is an abuse which, in these cases, it is too late to remedy.

Below the junction of the Grand and the Green, the principal branches of the Colorado from the east are the San Juan, which rises in the southern slopes of the San Juan mountains, the Colorado Chiquita, or Flax River, and the Gila; from the west are the Dirty Devil, the Paria, and the Virgen.

The drainage area of this vast region is limited on the east, north and north-west by high mountain ranges. On the east the mountain barrier commences with the Sierra Madre of New Mexico, thence passing up the San Juan mountains to the Sawatch and Park ranges of Colorado. From the northern end of the Park range the dividing ridge sweeps around the head of the Green in low, broken ranges, which afford several easy passes. It joins the Wahsatch range near its head, and follows it in a direction nearly due south to its foot in latitude 37°.

The rocks of this vast area are stratified, mainly sandstone, horizontally bedded or nearly so. The surface is nearly flat; there is no rolling or undulating country. Changes of level take place by very gentle slopes, or by abrupt, precipitous steps. A large part of the surface consists of bare rocks, with no soil or vegetation. A part is covered with thin, sandy soil, which supports a growth of sage and cactus, or even a few *piñon* pines and cedars. The vege-

tation when present is scanty, and only such as is characteristic of a dry and almost desert country.

Nearly every stream flows in a cañon, a narrow valley, with precipitous walls. The cañons of this region are all quite similar in their cross-sections. The upper edge is very sharply cut. At the top is a cliff, vertical, or nearly so, of a proportional height varying extremely. At the foot of this is a steep slope of talus. The more rapid the stream the narrower is the cañon, and the less the amount of debris; so that, in the case of some of the swiftest torrents, the cañons consist simply of two vertical walls, closely enclosing the stream-bed In the case of large streams, we frequently find a modification of this form. The cañon wall presents a series of benches from top to bottom, as though a series of cañons had been cut, one within another. At the foot of each bench there is, in nearly or quite all cases, a change in the character of the rock, that of the lower portion being the harder. Many beautiful examples of this kind of cañon have been observed by the writer.

Most of the cañons are cut in stratified rocks, nearly or quite horizontally bedded. Horizontal sections of these cañons show long, smooth curves, with no sharp angles. Vertical sections show abrupt precipices, and narrow benches, with sharp angles. Cañons cut in granite and trachyte, on the other hand, show very rugged horizontal, as well as vertical, sections. They have little or no talus, and very narrow bottoms. They are merely rugged notches.

These two classes of rocks are frequently combined in one cañon, forming a double cañon. This is the case with the Grand Cañon of the Gunnison, and in a portion of the Grand Cañon of the Colorado In the former, in the lower part of the cañon, about two thousand feet in height, the walls are extremely precipitous and rugged, and the river fills the bottom completely, leaving no beach whatever. At the top of the gneiss is a bench, nearly horizontal, extending back a few hundred feet, whence rises steeply a slope of talus, capped by a precipice of about two hundred feet. The whole height of the upper cañon is about one thousand feet.

The cutting of cañons of the general class described above, is confined almost entirely to Colorado drainage. With the exception of the cañon of the Snake river, in the basalt plateau of Idaho, the cañons of erosion are simple gorges by which streams traverse mountain ranges.

Now, why does this condition exist? Why is it that on this slope every stream cuts a cañon, while on the eastern slope, on the great plains, there are no cañons whatever? This is due to several causes, all which may be traced directly to the aridity of the climate and the amount and character of the rainfall. The atmosphere is extremely dry; the rainfall is very slight, and the little that falls comes, not in long storms, but in sudden deluges. From the dryness of the atmosphere and the want of moisture of the surface, there is little vegetation—very little indeed of arborescent vegetation; and, both as a cause and result, little or no soil. The rains, coming as they always do in floods, run immediately off the bare rock, or over and through the thin sandy soil, sweeping it with them, and collecting in the little runs with incredible rapidity, rush down them in great body and with great velocity, sweeping everything before them. The waters are turbid and thick with sediment, coarse and sharp-edged from the rapid cutting of the rocks. This sand and gravel carried in suspension is the principal cutting agent, as water alone has but little cutting power. The high winds also, which are very frequent in this country, fulfil their part, and a very important one in this work, in planing off the surface, and leaving their shavings in the form of sand for the waters to take up. The erosive power of these high winds, with the sand which they set in motion, is very great. A well-known example of their power is seen in the chiseling of the monuments in Monument Park, near Colorado Springs, Colorado. Numberless similar examples may be seen in the country of the Colorado River.

The difference between the conditions here and in other parts of the West is mainly one of degree only; but the results are widely different. In the case of the plains, on the eastern slope, the climate is moister, the rainfall greater, and the storms are of greater duration, and of a less sudden and explosive character. As will be seen farther on, the slopes of the streams are as great or even greater, showing that this element does not produce any of the effect in question. In consequence of this difference in meteorological conditions, the materials for soil, instead of being washed immediately into the water courses, and thence carried on by the streams as cutting agents, collect and become covered with vegetation. This, in turn, in great measure, prevents sudden floods.

The existence of this great plateau region was scarcely suspected

before the time of the Pacific Railroad explorations, which commenced about 1853. Captain Gunnison, with one of the parties engaged in this work, traveled down the Gunnison, and the Grand nearly to its mouth, and crossed the Green, traversing the whole width of this area without, so far as indicated by his report, suspecting that he was in a peculiar country. He was engaged in the discharge of his duty, which was to discover a practicable route for a railroad, and had no energies to spare for ulterior aims; although the geologist of his expedition might have been expected to see what lay before his eyes.

The party in charge of Lieut. Whipple, whose route was on or near the 35th parallel of latitude, crossed the plateau near the head of the Colorado Chiquito, and the geological report, written by Prof. W. P. Blake from the notes of Mr. Marcou, who accompanied the expedition as geologist, recognizes the character of the country which was traversed. In 1857–58 Lieut. Ives, acting under the War Department, went up the Colorado in a small steamer to the foot of the Black Cañon, about 500 miles above its mouth, and made an elaborate reconnoissance. Leaving the river near this point, he crossed the plateau in an easterly direction to Fort Defiance, New Mexico. On his way, he succeeded in reaching the edge of the Grand Cañon in two places, at the mouths of Diamond creek and of the Colorado Chiquito. The geological report of this expedition, written by Dr. Newberry, who accompanied it, first recognized the existence of this vast system of plateaus and cañons. It has remained for later explorations and surveys to develop our knowledge of the country in anything like detail.

With regard to the immediate course of the Colorado above the head of steamboat navigation, very little was known until quite recently. It was known that the river ran—for a part, at least of its course—through a tremendous cañon, in the great table-lands of which the country was made up; a cañon so deep that, in Western parlance, it required "the combined efforts of several men to see to the bottom." Wild stories of the river's having cut tunnels for itself in places were current, and stories of fabulously great falls obtained full credence. The two views of the Grand Cañon which Lieut. Ives had obtained, served but to give basis to these extravaganzas. The stories told by trappers and prospectors, who had,

in their wanderings, reached the margin of the cañon, were worthy of the Arabian Nights.

The first information which was at all authentic, concerning the river's course and its cañon, above the point which Ives reached, is contained in a paper by Dr. C. C. Parry, read before the Academy of Natural Sciences of St. Louis. It consists of an account of the descent of the cañon of the Colorado, by one James White, in 1867. The account states that he, with two companions, had been on a prospecting trip in the San Juan mountains, in southwestern Colorado. Not having much success, they turned their backs on the mountain, and traveled down the Mancos and San Juan rivers. They followed the latter stream down to the head of its cañon, where they left it and went northward to the Grand River, crossing on their way a range of mountains. They reached the Grand about eighteen miles above its mouth, and, looking for a place to descend from the plateau, followed it up for twelve miles, when they found a way down and crossed the river; but in climbing to the summit of the plateau on the other side, were attacked by Indians, and one of their number killed. The two remaining made their way back to the river, hastily constructed a raft, and started down the stream. Soon after passing the mouth of the San Juan, on the fourth day of their adventurous voyage, White's companion was washed off the raft and drowned. All the provisions were lost at the same time, and thenceforward White suffered much from hunger. On the fourteenth day, he reached Callville, at the mouth of the Virgen, more nearly dead than alive.

The facts which White observed in this terrible trip have been confirmed by Major Powell's observations, and show his account to be authentic; for instance, that the junction of the San Juan is in a heavy cañon, and that there are no large cataracts or any perpendicular falls. The average height of the cañon walls White estimated at 3000 feet, which is not far from the truth respecting the immediate cañon. The upper benches, which, though set back some distance from the edge, can properly be regarded as part of the cañon, could not have been seen by him, drifting along at the bottom of the abyss. He speaks of passing for days between walls of dark-colored, igneous rock, which is undoubtedly the granite that Major Powell notes in the Grand Cañon.

In 1869 an attempt was made to navigate the Grand river by

Capt. Samuel Adams. He started at Breckinridge, Colorado, near the head of the Blue, and succeeded in getting to the mouth of the Blue and down the Grand a short distance, when his boats were wrecked and the expedition was abandoned.

At this time enough was known concerning the character of the country bordering the Colorado and Green rivers to show that the only practicable way of exploring these streams would be by following them down in boats. The impassable character of the cross-cañons alone made it impossible to follow the streams by land, even without the additional difficulty from want of water and vegetation.

Acting on the above conclusion, Major J. W. Powell undertook to navigate the rivers through the whole length of the cañon country, from Green River station, on the Union Pacific Railroad, to Callville, at the mouth of the Rio Virgen. The story of this trip has been told most admirably by Major Powell himself, in the pages of Scribner's Magazine, and also in his report, made to the Secretary of the Smithsonian Institution; so that it will be necessary here to make merely the briefest recapitulation of the events, and a short sketch of the results of this adventurous voyage.

He started late in May, 1869, with a party of ten men, in four boats. They met with various adventures incident to such a voyage on a swift stream, but no serious mishaps, and on August 30th arrived safely at the mouth of the Rio Virgen. They found no falls and no very bad rapids: in many places were obliged to make portages, some of them long and difficult. They were forced to run several rapids; and one can easily imagine that, at times, the traveling was exciting enough.

The branches of the Colorado and the Green from the East, the the Tampa, the White, the Grand and the San Juan, have been examined from their heads nearly or quite to their mouths by the survey under the charge of Dr. F. V. Hayden.

Starting at the head of the Green River, we find it traversing in a southerly direction a desert country, of alkaline soil, producing a rank growth of that staple product of the West, *artemisia*, or, popularly, sage-brush. This is the Green River basin. At the foot of this basin the river meets the Uinta range, trending east and west, directly across its course. This range it traverses, by a devious course, cutting gorges of enormous depth, and on its way receives the waters of the Tampa. On emerging from the mountains it enters

another valley, quite similar to that above, and known as the Uinta basin. In this basin it is joined by the Uinta and White Rivers. Traversing this basin, it gradually enters a cañon in stratified beds. These beds, and the surface of the country with them, incline at a very low angle towards the north, so that the stream, in its southern progress, is constantly getting deeper and deeper below the surface, until, in a distance of ninety-seven miles, the walls have risen to a height of 3300 feet above the river. At this point the walls break off abruptly, in a direction transverse to that of the river, leaving a small valley at the foot of the cliff.

Lower down, the river commences immediately to run into a second cañon, of a character precisely similar, and ending in a similar manner, by an abrupt cliff. The length of this second cañon is thirty-six miles, and its height above the river, at the foot, is 2000 feet. A third similar cañon follows, of a length of sixty-two and a half miles and a maximum depth of 1300 feet, before the mouth of the Grand is reached. The upper of the cañons produced by these inclined steps has been named by Major Powell the Cañon of Desolation, and the cliffs at its foot, the Brown Cliffs. The second, Gray Cañon, and its cliffs, are known as the Book Cliffs or Book Mountains, of Captain Gunnison's narrative. The line of these cliffs extends in an easterly direction to the Grand, and borders the Grand in an almost unbroken line to the edge of the mountains. The third cañon bears the name of Labyrinth Cañon, and its terminating cliffs, the Orange Cliffs. Stillwater Cañon begins at the foot of the Orange cliffs, and extends below the junction of the Grand and the Green. The meeting of the waters takes place in the gloomy depths of this canon, 1300 feet below the upper surface.

Following the Grand River up from the point of junction, we find its enclosing walls gradually lessening in height until they are scarcely more than bluffs in size. Then we approach the Sierra la Sal, which rears its bare summits 9,000 feet above us, and 13,000 feet above the sea. Here the monotony of plateau and cañon is broken. The enormous eruption of trachyte by which these mountains were formed has terribly upset the country for many miles around, and through the mass of ruins the great river is hard pressed to find a passage. Farther up, we find it alternately winding about tranquilly in open valleys, and rushing madly through cañons in the

soft sandstones, until we reach the edge of the mountains. Here we leave it and return to the Colorado.

A short distance above the junction of the Grand and the Green, the surface of the country begins to rise with a long, gentle slope, towards the summit of a fold. Stillwater and Cataract cañons are cut in this fold. The walls grow gradually higher, but before the river reaches the axis of the fold, it seems to become discouraged at the prospect of the difficulties ahead, and turning nearly at right angles, it runs, diagonally to the axis, and as gradually out of the fold, at the mouth of the Dirty Devil River. The axis of this fold must have a direction about northeast and southwest. There is here a bit of open valley, and then another cañon—Glen Cañon—succeeds. In this latter the river passes around the end of the fold which headed it off above. In the course of Glen Cañon the river crosses a monoclinal fold where the dip is slightly north of east. The greatest height of Glen Cañon is at its foot, at the mouth of the Paria, where it is 1600 feet.

Again the river runs into cañons, as if afraid of the sunlight. There is here another inclined plateau sloping towards the north, and in it the river burrows deeper and deeper until, at the mouth of the Colorado Chiquito, it is 3800 feet below the surface. This is Marble Cañon. The river has turned towards the west, and at the foot of this cañon, or—for this is continuous with the Grand Cañon—at the foot of this portion the general course of the river is west. At this point it is crossed by the Paria fold, in which the drop of the beds is to the east, thus suddenly increasing the height of the surface of the country and that of the walls. At the point of crossing the river the throw is about 1,800 feet.

Farther down the river is met another fault, which in some places is preserved as a fold running across the river's course. This is an enormous one, with a throw of about 3,000 feet. The drop is here, as in the Paria fold, to the east. This is the Eastern Kaibab fault, and the plateau above it is known as the Kaibab ("*mountain lying down*") plateau. The cañon here gains its maximum depth, which is more than 6000 feet. This is not in a single slope from the water; a large part of it is in one or two benches, which stand back one, two, or three miles from the edge of the lower cliffs. The great throw of the Paria fold has brought to the surface the

underlying granite, and the lower cliffs of the Grand Cañon are of this rock.

Crossing the Kaibab plateau towards the west twenty-five or thirty miles, we encounter a steep descent to the west. This marks the line of a fault, the Western Kaibab fault. This also, like the other, is in some places a fault, in others a fold. The throw ranges in amount from 500 to 2,000 feet. The deepest part of the Grand Cañon is now passed.

Still going west, we pass over a flat couutry to another steep descent, this time of about 800 feet. This marks the line of the Toroweap fault. Twelve or fifteen miles further in the same direction, and we meet another and greater fault, with the throw in the same direction, and of 2000 to 3000 feet throw. This is called the Hurricane Ledge fault, and twenty-five or thirty miles beyond is still another, the Grand Wash fault. This is an enormous one, with a throw of 5,000 feet where it crosses the river. This brings the level of the country nearly down to that of the river; and thus ends the Grand Cañon.

Thus we find its walls to rise in successive, abrupt steps from the east, the intervening plateau being nearly flat, until they reach a height above the river of more than 6,000 feet,—where the river cuts through the Kaibab plateau,—and then to descend in a similar manner to the level of the river at the mouth of the Grand Wash.

Below the Grand Wash, a dry stream-bed which enters the Colorado from the north, the river turns south again, and enters the Black Cañon of Ives's report—a cañon which would be a remarkable feature were it not brought into such close juxtaposition with that briefly described above.

Below it the river runs in narrow valleys and low cañons to its mouth.

An examination of tables showing the slopes of the Green, Grand Colorado and Arkansas Rivers, illustrates the fact that the slopes of the streams of the plateau region are not materially different from those of the rivers of the plains. The profile of the Grand River is known from the work of Dr. Hayden; that of the Green and the Colorado from those of Major Powell and Lieut. Ives; that of the Arkansas is derived from Dr. Hayden and from other sources.

HENRY GANNETT.

CONCERNING ZEAL. III.

IF in any community of the old world, which especially prided itself on its public schools and the general diffusion of intelligence among its people, we were to find a popular work of history in which the American Revolution was described as a Canadian insurrection, and General Washington as a Canadian hero, it would most likely make us skeptical as to depth and quality of the knowledge possessed by its people. Yet in the popular accounts of the Murid war in the Caucasus[1] which circulated in this country and in England some fifteen or twenty years ago, we find accounts of Schamyl *and his Circassians*, thus identifying the great Murid chieftain with a people whose boundaries he never crossed, whose soldiers never fought under his banner, and who evinced from first to last not the slightest sympathy with the great struggle for Caucasian and Mohammedan independence in which he was engaged. Aliens alike in race and in religion from Schamyl and his people, the Circassians (or *Tscherkesses*) were stirred by none of the impulses that prevailed among their mountain neighbors to the east of them. They were themselves comparatively recent converts to Islam, and very imperfectly acquainted with their professed creed. Up to early in the eighteenth century the Circassians were Christians, first converted by the Genoese, though their Christianity coexisted with much ignorance and barbarism, and many survivals of their primitive Paganism. To the last, the Circassians never lost a superstitious reverence for the Christian shrines and ruined wayside crosses which line their mountains. And when they submitted to expulsion from these mountains by the Russians, almost without striking one manly blow for their creed and their country, and were transported to Turkish territory, it was found necessary to teach them the first principles, the commonest usages, and the commonest prayers of Islam. Their Mohammedanism, such as it was, was of the orthodox or Sonnee type; while the Shiya'ee sect, though not universal in the Eastern Caucasus, was that of Schamyl and of most of his subjects, and had been the creed of their fathers for seven or eight cen-

[1] Take for instance the popular work *Schamyl and the Circassian War*, by Mr. John Mackie, published in 1856 by Jewett of Boston, and very widely circulated at the time.

turies. Under the influence of the Murid revival, the popular acquaintance with their creed and its laws among the tribes of the Eastern Caucasus was not behind that which existed in any quarter of the Mohammedan world. It was the bond which united them in spite of the widest differences of race, the natural isolation produced by intervening mountain ranges, and long traditions of separation.

From the earliest historic times this mountain range has been peopled by "more than a hundred" tribes, whose variety still makes it a sort of ethnological and philological museum. It reminds one of a thorn-bush growing by a thoroughfare through which many flocks of sheep have passed; every flock has left a tuft of wool in its passage. Situated on the great highway of the nations, it has seen the hordes and tribes of Asia pouring into Europe for millenniums past. And its petty valleys of alluvial soil, at once productive and easy of cultivation, have attracted little colonies from every great migration to settle among its hills. In the time of Pliny, when Colchis was still the mart for commerce with the far East, one hundred and thirty languages were spoken in its market place. An Egyptian colony and a colony of Chinese from Assam vied in the cultivation of its rich but scanty soil, and nearly every race between the Nile and the Pacific were represented among its peoples. If the peoples we call Turanian or Hamitic, for convenience of classification, were in the majority, the nobler Aryan race was not absent, and the Iran or Ossetian race still represent "the children of light" in this great boundary between the "Iran" and the "Turan" of the Persians.

This variety of race is confined chiefly to the Eastern Caucasus, for the passes of the western or Circassian part of the range lead down only to the shores of the Black Sea. And among this variegated population, zealous Shiya'ee missionaries of Persia had early proclaimed the faith of the Prophet, and had it brought to some sort of religious and political unity, though without interfering with the differences of language which separated its little districts. At the beginning of the present century, political unity had entirely disappeared. Every petty district had long been living under hereditary chieftains, who jealously preserved their independence, and waged endless wars upon each other and upon the plains. Freebooting was the usual profession of the people. They were diplomatically regarded as having formed a part of the Persian Empire, until the treaty of peace between that and the Russian Empire, in 1812,

transferred them to the latter. But for centuries they had taken no orders from the Shah, and they had no intention of paying any allegiance to the Czar. Such a relation of a mountaineer people to the government within whose territory they lie, has never been unusual in the East. It has been the position of the Kurds (the Kardouchians of Xenophon) from the first; even when they lay at the very gates of the sovereigns of Nineveh, they still preserved a virtual independence; and as their country did not present sufficient inducements to balance the hard fighting needed for its conquest, they were quietly left alone. So Persia had treated the people of Lesghistan and Daghestan, whom she now transferred to Russia; but Russia followed different maxims, and would tolerate no independence within the boundaries of the empire. The *Tarikat* and *Shariat*, or moral and judicial law of Islam, must give way to the imperial law.

At first it would seem as if no united resistance would be offered to the conquest, and that they would take the districts in detail. The Moslems of the plain throughout three Khanates made their submission, and the Khans took their places in the civil service of the Czar. And least of all did the religious condition of the country promise a successful resistance. Its Mohammedanism had fallen into decay; the laws to be set aside had long been neglected; the Moollahs as a class were grossly ignorant, covetous and neglectful of their duties; the sacred customs were neglected, and a general indifference to their religion pervaded the whole country. But in one heart in Daghestan the fire of Moslem zeal burned steadily and fiercely, and thence it spread until the Eastern Caucasus was ablaze. Mohammed Moollah, the author of the Murid revival, was a man of noble bearing, of great purity of life, and devoted to the law. He was completely blind, but in spite of this obstacle he had obtained the highest place among the teachers or clergy of the province; and the little mosque at Jaraglar was crowded with disciples to hear his expositions of the law and his exhortations to full obedience. It stood among the other small huts of a mountain village, an humble, two-storied dwelling, with a small external staircase leading to a sheltered balcony. Its interior is a naked apartment, thirty paces in length by eighteen in width, dimly lighted by three port-holes, and poorly carpeted with felt. Its walnut pulpit and the Koranic tents on the wall are the only relief to its barren-

ness. And this was the birthplace of a new faith, and here this mild-mannered, gentle-voiced, sightless Moollah began to preach to all Daghestan the war of zeal.

Tradition carries the new doctrine a step farther back, and speaks of a certain mysterious Ishmael in Shirvan, to whose feet our Mohammed made a pilgrimage when he was himself already the greatest and most popular Moollah in the Caucasus. But the story seems to us improbable. It was not by new expositions of the law that the zeal of the Murid was aroused; it was by the sense of danger and degradation to his faith and his people from the invasion of the Infidel. And no Persian Shiya'ee, no one but a mountaineer in view of the danger that threatened his mountain home, would have formulated the creed which was preached in the mosque at Jaraglar. For the peculiarity of Muridism is its attempt to close and reconcile the prolonged strife of Sonnee with Shiya'ee. Here, where the two great Moslem empires have so long stood face to face with their great northern enemy, and were both about to yield before the astute policy which used each alternately against the other, Mohammed pleaded for their reconciliation on the matters which lay at the root of their dissension. In compliance with the prejudices of the great majority of his countrymen, he retained the external usages and political organization proper to the Shiya'ee sect. But on the other hand he proclaimed the Sultan of Turkey the lawful Caliph of Islam, while regarding him as having fallen for the present under the power of the unbeliever, and therefore unable to issue the necessary orders to begin the war of zeal. He therefore assumed the authority to proclaim the *jihad*, and his proclamation was conveyed to every village throughout Daghestan by his Murids, a secret organization to teach, to organize, and to share in the holy war. In every part of the country organizations were formed under their direction. A few of the Moollahs protested faintly that only the Caliph could order the *jihad*, and that the Koran itself forbade such a step wherever the faithful were outnumbered by the unbelievers. But the rising tide of the popular enthusiasm carried them away, and before the close of the third decade of the century the new movement had made itself master of all the mountains of Daghestan, and had begun to extend to other provinces of the Eastern Caucasus.

Kazi Moollah, the chieftain selected as the military head of the sect by Mohammed Moollah, prior to his own retirement to complete

seclusion, spent the first five years of his government in consolidating and extending his power. The petty chieftains, khans and beys, who possessed hereditary authority over the little tribes, were one by one brought into subjection and enrolled in the general mass of the faithful. The isolation of the separate districts was as far as possible overcome by a common organization, and by transferring both civil and military authority to the zealots of the sect. In the mountains he had success beyond his expectations, and even districts in which he had made no direct efforts sent in their adherence to the cause. But in the Khanates of the plain even of Daghestan, Russian influence was all-powerful; and in 1830 he began a series of sallies from the mountains, plundering the plain districts, and sparing neither Christian nor Moslem. But he lost confidence by sustaining some reverses, and in 1832, after resigning the command to Ghazmet Bey, he was besieged in his native village by the Russians, and killed in defending his own house to the last.

If Muridism could have been ruined by the faults of a leader, its second general would have ruined it. Although solemnly recognized as leader by Mohammed Moollah, he was destitute of the enthusiasm which animated his people, and was actuated only by personal ambition. After a few years of power, he was assassinated in the mosque by the foster-brothers of the young Khan of Avaria, whom he had treacherously put to death, and the command devolved upon Schamyl, the greatest of the Murids.

Schamyl was a native of Lesghistan, and his place at the head of the movement indicates its spread to the West. He was not the mere mountain warrior presented to us in most of the narratives of his exploits. He was a learned doctor of the law, a most eloquent preacher, an inspired prophet, and a mystic deeply imbued with the theosophy of the Persian Soofees. But with all his literary accomplishments, he was just the man for the difficult position. Much above the average height and strength, he had perfected his powerful physical frame by sustained exercise. His physiognomy marked him as a man of superior race, as probably of Aryan stock; and his manly beauty was the pride of his people. In intellect he was most fertile in expedients, never disheartened by reverses, full of enthusiasm for his cause, not less full of confidence in himself and his mission. And yet these qualities were checked and balanced by a sobriety, a common sense, an insight into the fitness of means to

ends, which rarely allowed him to miscalculate his probabilities of success, or to undertake a needless hazard. He could be at once the centre and source of his people's religious zeal, and the wary general that used their enthusiasm to the very best purpose. They looked up to him as a supernatural being, possessed of resources of a sort not common to mankind. His wonderful escapes seemed altogether "uncanny." He fell pierced with two balls at the side of Kazi Moollah, when that hero was killed at the taking of Ghimri, and he was left for dead. More than once the Russians captured the hill-fort in which Schamyl had taken refuge, after closing every possible way of escape; and then, after making the most careful scrutiny of the place, they found the bird had flown. No wonder that the simple mountaineers thought him kept in the especial care of Allah, and saluted him as one "raised from the dead to rule the living."

Yet no man can effect impossibilities; and had the military resources of Russia been rightly directed against Schamyl, instead of offering a twenty years' resistance, he must have succumbed in less than as many months. But the Russian generals were inspired by a sort of contempt for their enemy, which greatly contributed to his safety. Instead of perceiving that he had united the whole population of the Eastern Caucasus in a religious enthusiasm which was equivalent to the enlistment of every man, woman and child in his service, and that he had effected a complete and close organization of the most diverse elements by means of the Murid organization, they proceeded upon the Freebooter theory of the war. To fix upon the spot where this nest of banditti had their headquarters, to break up the gang by a sudden rush into the country, and, if possible, to sieze Schamyl, was the only plan they ever entertained. A fair specimen of this sort of campaigning was the expedition against Achul'gho in 1839. From June till September the place was subjected to a regular siege, and taken by storm with a loss of five hundred killed and nearly five times as many wounded. The storm "lasted a full week—from the 3d till the 10th of September. The Murids, although they had no hope of escape, would not surrender, and defended themselves like madmen. Women and children, with stones or dirks in their hands, flung themselves upon the bayonets, or hurled themselves into the abyss in their desperation. Mothers with their own hands slew their children, that they might

not have to give them up to the Russians; whole families were buried under the ruins of their houses. Individuals of the Murids, who were already enfeebled by their wounds, seeking to sell their lives as dearly as possible, inflicted deadly wounds upon those who sought to carry them off the field."[2] But Schamyl escaped them, probably by passing across the mountain on whose side the village and fort was situated; and the Russians achieved nothing at all commensurate with the extent of their efforts and their losses. When they returned to the plains, as they were obliged to do by want of supplies and of the means of transportation, the whole country was as absolutely in his power as ever it had been. Not even his *prestige* was impaired. On other occasions he adopted the bush-whacking tactics of the *guerrilla.* The Russian army found the whole country ahead of their column deserted; the villages empty and stripped of their valuables, or occupied only by a few women and children, while from every bush, tree and rock on their flanks a constant fire was kept up. And when at last they retreated, after effecting nothing worth speaking of, they were exposed to a constant fire in the rear until they emerged from the mountain defiles and reached the open plains. Then, with the rapidity of lightning, Schamyl would gather an army, and, selecting some undefended point in the Russian territory on the plains, would burn and plunder its villages and kill or carry off its people, and retreat to the mountains, fighting, as he went, with the Russian forces sent to intercept him.

The most famous of these sorties was that into Georgia in 1854, when two Georgian princesses were carried off to the mountains. Georgia, the ancient Iberia, called by the Russians Grusien, was a Christian nation of the Orthodox rite, but was long subject to the oppressions which their more powerful Moslem neighbors, especially the Turks, saw fit to inflict. One of these was an annual tribute of boys and girls, who were brought up as Mohammedans. In 1795 the Turkish aggressions had gone so far as the capture of their capital Tiflis, and the consequent withdrawal of their Government into the one remote province left it. Their King, dying the same year, bequeathed his kingdom to the Czar Paul, and when Alexander I. came to the throne he long hesitated about accepting

[2] *Sechzig Jahre des Kaukasischen Krieges; nach Russischen Quellen. Von G. Baumgarten.* (Leipzig, 1861.) S 109.

the bequest. It was his final decision which committed Russia to her great advance across the Caucasus upon the Turkish and Persian Empires, and consequently to the war whose fortunes we are describing. Schamyl's raid upon Georgia was a very politic movement. It was at the time when Russia was busied with the Crimean war. No active effort for the conquest of the Caucasus was going on, and the troops of the department had been for the most part withdrawn to the neighboring seat of war at Van. It was therefore safe to venture as far as the neighborhood of Tiflis, and in that neighborhood he might fairly expect to find captives of such a rank as would repay the danger by their ransom. But money was not his sole, nor even his main object. In the capture of Achul'gho in 1839, his oldest and best-loved son had fallen into the hands of the Russians. The lad had received the finest education that the Imperial capital could furnish, and had entered the Czar's service as a lieutenant of a Russian regiment. All his tastes had been given a new direction, not that which they would have received in the Caucasus. But Schamyl's heart yearned for his boy, and to secure some one whom he could offer in exchange for him was his chief object in seeking captives of rank by a raid into Georgia. The raid was quite successful; a large quantity of plunder and a great number of people were swept away from the peaceful province, which had hardly heard the sound of warfare for fifty years. And among the captives was a princess of the former royal family, and her relative, a lady of nearly equal rank. From their pens, after their return to Georgia, Europe received the first really authentic account of Schamyl, his home, and his people; and while their narrative is not always unprejudiced, it always furnishes us with the material for a fair judgment. They give us no very exalted estimate of Lesghian civilization, representing them as an ignorant and barbarous people, full of the most extravagant notions as to Georgian and Russian wealth, and greedy of gifts. It seems that Schamyl, even after he was convinced that the sum offered by the relatives of his captives was the largest that they could give, had some trouble in getting his Murids to agree to accept that, with the return of his son, as a proper equivalent. He had, in fact, to appeal to the religious excitability of his people, by bringing forward an old and much respected Moollah who for several days preached a sort of ascetic doctrine to the people, including a great contempt for filthy lucre.

The preaching had its effect, and the exchange was effected. The princesses and their attendants were restored to their friends and their homes after a captivity of nearly a year, and Schamyl's son returned to his native mountains with mingled feelings of affection for his father and of dislike for the sort of life he would be expected to lead. Schamyl would not allow his son to approach him in the Russian uniform; he postponed their interview until it had been exchanged for the brilliant costume of a mountain chieftain.

The young prince had not many years to spend in the mountains, for the beginning of the end was already come. In 1856 the command of the forces in the "government" of the Caucasus was entrusted to Prince Barjaetinski, with the possession of just the territory held at the opening of Schamyl's reign. Not a yard of soil had been conquered during the twenty years of continuous but blundering effort. In the autumn of 1859, the Prince issued an address to his soldiers, congratulating them on the conquest of the entire region, and four days later he announced that Schamyl was his prisoner.

The reason of this success is to be sought in the superior wisdom of the plans adopted by the new commander. He gave up at once the Freebooter theory of the war, and recognized the fact that Schamyl had at his back the whole people of his mountains. It was therefore no longer, as in times past, possible to conquer the country by taking the several tribes in detail. A united and enthusiastic people were to be subdued, and any disposition to undervalue their power or their determination would be disastrous. Prince Barjaetinski began by constructing a military road into the heart of their territory, and fixing a permanent centre of operations in the very midst of their mountains, with close and continuous connection with the plains. He made them understand that he had come to stay. His base of operations was chosen with consummate skill. Together with the military road which led to it, it nearly cut Schamyl's territory in two, and from it the Russians were able to attack each province and district in detail, while no other could come to its aid without laying itself open to a disastrous invasion. In this way the prestige of the new political union effected by Muridism was destroyed, and the old spirit of local particularism was awakened in the people. Some hill-forts offered a stouter resistance than others; there was much hard and steady fighting, but there was no great and united effort at concerted resistance. The fatal blow to

the power of Muridism was the voluntary submission to the Russians of two important tribes; and it might be said that after thirty years of unquestioned sway, the system broke up within three days, as this news spread among the mountains.

Schamyl's last stand was made at Mount Ghunib, in the district of Andalal, in southeastern Daghestan. The inaccessibility of the place, and the temper of the people, were both in his favor. Deserted by all but a few of his soldiers, he fled thither through districts already submissive to the Russians or hostile to himself, and entrenched himself in this last stronghold with a few hundred of his most devoted adherents. The entire people of an adjacent district, under the leadership of one of the very founders of Muridism, took the field against him; but the nature of the place seemed to render his capture impossible. "Mount Ghunib," he said, "is higher than the mountains, and there I sit. Above me, and still higher up, is God. Below me are the Russians. Let them take us by storm." But under cover of an assault in front, the Russians scaled the mountain in the rear and mastered the plateau which he held, while Schamyl retired with his Murids to the fortress. After two hours of parley, he surrendered himself to Prince Barjaetinski in person on the 25th of August, 1859. He died at Mecca in 1871.

Thus ended the political and military career of Muridism. With its disappearance, the unity of the tribes of the Caucasus disappeared also; local interest and particularist feeling revived in their old force, and the hereditary chieftains resumed their old places, or were replaced by new men whose eminence was the creation of the war. The democratic equality of Islam disappeared with the fall of the chieftain who made it possible, but will yet be restored by the Russification which every province of the Empire is destined to undergo. In this one thing, Russia is Moslem in her ideas, and the Czar is but a Christian Kaliph or Imam, who will tolerate no eminence but his own. What Kasi and Schamyl did with the petty chieftains of the Caucasus, the Alexanders and the Nicholases are doing with Poland, with Georgia, with Circassia, with the Baltic provinces; and will yet do with the Caucasus and Bokhara, and it may be with Finland. It is substituting everywhere a bureaucracy for the old nobility, who represent local traditions and local methods of government, just as did every Kaliph and Sultan who knew what his office was meant to be.

In comparison with Wahabeeism Muridism, as might be expected from the difference of the circumstances in which it originated, presents marked differences both of spirit and of detail. It is more like the Wahabeeism of India than that of the Nejed. It is not a protest against the corruptions of Islam itself, so much as an insurrection against the infidel who would fain overthrow the holy law. Its watchword was the *Shariat*, and not an anathema of *Sherk*. In its theological aspect it had not the severe, exclusive and intolerant aspect towards other parties in Islam that was taken by the Wahabees. It was irenic rather than polemic; inclusive rather than exclusive. Holding the frontier between Islam and Christendom, it was a plea for united action, for the union of Sonnee and Shiya'ee, against the common foe—a union not unknown, it is said, in the annals of Indian Wahabeeism, but utterly abhorrent to the true believers of central Arabia. And the Shiya'ee origin of Muridism was shown by the mystical character of its practical teaching. To the theocratist—be he Brahmin or Covenanter, Wahabee or Puritan—the relations and things of time and sense possess an inexhaustible significance as a part of the Divine Kingdom on earth. To the mystic—be he Buddhist or Soofee, Quietist or Quaker—they are less than nothing, mere vanity. To be abstracted from them, that we may have the mind firmly fixed upon the unseen and the eternal, is to the mystic the first and simplest of duties.[1] And so the Murid was taught. His creed had three leading articles—(1) complete obedience to the Shariat; (2) holy war against the Infidel; (3) utter severance from all things temporal and earthly, that Allah might be loved and obeyed with unselfish and unquestioning devotion. It was a strange blending of incongruous elements, and one which must have fallen into dissolution with the attainment of any permanent success.

ROBERT ELLIS THOMPSON.

[1] A very fine illustration of the difference between the two religious tempers is given in the life of Leighton. When he was still a Presbyterian pastor in Covenanter times, he with others of his brethren in the Presbytery were asked, among other things, whether they "preached to the times." When it came Leighton's turn to answer, he confessed that he had not, but he hoped that with so many "preaching to the times" one poor brother might be tolerated in preaching for eternity.

FORCE.

THERE are among modern scientists wide differences of opinion respecting the nature of force. Many regard forces merely as mutually convertible modes of motion, and embrace in their definition not only mechanical and chemical, but even all vital phenomena. If this be true, then, as far as our powers of conception go, the existence of spirit is a myth; matter is the only real entity possible. At first there appear to be solid grounds for such a faith. The cold iron, by its arrest of the blacksmith's falling hammer, is raised to red heat; one force instantly vanishing, another as instantly taking its place. Is not the second a changed form of the first? Is not the first a motion of mass; the second, a motion of molecules, and thus simply the first distributed? By a parity of reasoning the same conclusions are reached in reference to the other forces. A waste of brain tissue always accompanies processes of thought and decisions of will. What are the latter, therefore, but chemical affinities or electrical forces in other forms; and what are they all in fact but different motions of matter?

Other theorists, while they hold that forces are thus mutually convertible, yet contend that they are different forms under which one and the same spiritual entity makes its appearance. If this be true we may perhaps infer the existence of a God, but it is at best the impersonal god of pantheism; for a permanent personality, or even any, cannot be affirmed of a whole, the personalities of whose parts, by which alone it is known, are confusedly separate and perishable. That personal identity can be destroyed is possible, but to affirm that it is convertible involves an absolute contradiction of terms.

Faraday, in his remarks on the Conservation of Force,[1] says: "There may be perfectly distinct and separate causes for what are called chemical actions, electrical actions and gravitating actions, constituting so many forces; but if the conservation of force is a good and true principle (and this he most emphatically declares) each of these forces must be subject to it; none can vary in its absolute amount, each must be definite at all times, whether for a particle or for all the particles in the universe, and the sum, also, of the three forces must be equally unchangeable. Or there may be but one cause for these three sets of actions, and in place of three forces we may really have

[1] Youmans' Correlation and Conservation of Force, page 379.

but one, convertible in its manifestations." In this same paper[2] he observes that the commonly-received idea of gravity appears to ignore entirely the principle of the conservation of force, and, by the terms of its definition, if taken in an absolute sense, 'varying inversely as the square of the distance,' to be in direct opposition to it." This apparent creation and annihilation of force, however, he thinks science will some day account for, perhaps by the discovery of phenomena proving that the bodies, whose attraction for each other so mysteriously comes and goes, experience exactly corresponding structural changes, and that thus conservation is maintained. But this strange conduct on the part of this, one of nature's most prevalent forces, has occasioned distrust in the soundness of these theories, and a new one has accordingly been propounded, which bids fair eventually to prevail. Professor Tyndall, perhaps its ablest advocate, has left us a very clear statement of it in an article entitled, "The Constitution of Nature" in his *Fragments of Science.* The theory, as I understand it, is briefly this: Of essential causes science has no knowledge, and concerning their nature and ways of working it can safely make no statement. They and their phenomena have, however, been sadly confounded, and the law of conservation has consequently been falsely affirmed of both. All matter is supposed to consist of elastic molecules. When the hammer strikes the bar of iron, the molecules thus forced together rebound and, being again driven in, again rebound; and when this vibratory motion reaches a certain violence our nerves of touch recognize it as heat, and, if suffered still further to increase, it finally affects our nerves of sight, the iron begins to glow. But there is here no exhibition of conservation of force proper, for the motions of mass and of molecules, to which alone the law of conservation applies, are energies, not essential causes; one being the result of several forces, gravity among the number, the other of atomic repulsion. The attraction of gravity constantly increases while the hammer approaches the rod, and reaches its maximum the instant the blow is struck. The increase is a direct creation, so far as science sees. On the other hand, as the rod's atoms are driven together by the blow, a repellent power appears among them which thenceforward constantly increases, until it is able to hurl them back again. This increase

[2] Youmans ubi supra, page 363.

cannot come from the gravity, for this does not suffer from the collision the least diminution in either hammer or rod. At each oscillation of the atoms force is seemingly both created and destroyed—no one knows how.

Tyndall remarks,[3] "When two atoms of hydrogen unite with one of oxygen to form water, the atoms are first drawn toward each other, they move, they clash, and then by virtue of their elasticity they recoil and *quiver*. To this quivering motion we give the name of heat. We must not imagine the chemical attraction destroyed or converted into anything else; for the atoms when mutually clasped to form a molecule of water are held together by the very attraction which first drew them toward each other." He also says in the same essay,[4] "As regards convertibility into heat, gravity and chemical affinity stand on precisely the same footing. The attraction in the one case is as indestructible as in the other. What is meant in the case of chemical affinity is that the pull of that affinity acting through a certain space imparts a motion of translation of the one atom towards the other. The motion of translation is not heat, nor is the force that produces it heat; but when the atoms strike and recoil, the motion of translation is converted into a motion of vibration, and this latter motion is heat." On the thirty-first page he makes the general statement, "Of the inner quality that enables matter to attract matter we know nothing, and the law of conservation makes no statement regarding that quality." Carefully distinguishing between the effect and the force of gravity, he shows how unconsumed tensions and *vis viva*, the work-producing power of a particle, constitute a constant quantity styled energy, and that to this combination, and to this alone, the law of conservation pertains. Gravity thus explained proves no exception to the rule.

I wish to call particular attention to the ground here taken by Professor Tyndall, for his views are now generally conceded to be those of the most advanced science. He has made the subject a speciality, has published extensive treatises upon it, and his writings are quoted as standard authority throughout the scientific world. According to him, forces are not simply mutually convertible modes

[3] Fragments of Science, p. 30.

[4] Ibid, p. 16.

of motion, neither are they different manifestations of some one force, but are distinct spiritual entities, and are each possessed of an indestructible identity. Of energies and not of forces can convertibility be affirmed. This gives us in inorganic nature, fifty-seven or more individual elemental powers, and however far science peers into the past, it can detect no diminution of that number. The homogeneity of matter and force, then, to which Herbert Spencer so confidently points as the primal state out of which has evolved the heterogeneity of to-day, is all chimera. In the inorganic world there has been no advance from the simple to the complex in the ingredients themselves, but only in their combinations. Those particles which chemists at present call hydrogen, oxygen, carbon, nitrogen, have never been anything else than what they now are; they have been the dwelling-places of precisely the same wonder-working spirits; not a single virtue has gone out from them, not a single virtue has entered in, a thousand million years proving as impotent as a single fleeting second to effect any change. If the evolutionists refuse to accept this theory of Tyndall, and persist in asserting the conservation of force rather than of energy, gravity confronts them insisting on an explanation, and no system of philosophy can long withstand the seemingly direct opposition of a force acknowledged to be thus absolutely universal.

Note how insecure the foundations on which rest the Nebular Hypothesis as presented by its modern advocates. According to the *American Encyclopedia*, it supposes the universe to have commenced as a homogeneous nebula, and to have experienced the following changes: "1st, mutual gravitation of its atoms; 2d, atomic, repulsion; 3d, evolution of heat by overcoming this repulsion; 4th molecular combination; 5th, heat set free by this chemical action; 6th, radiation of heat and consequent precipitation of binary atoms forming irregular flocculi; 7th, and finally, a rotary motion induced by gravity acting on these irregular masses.

If at the beginning there was but one kind of matter and but the one force gravity, the latter would have to change a part of itself into atomic repulsion before it could encounter it and thus generate heat. This might rightly be considered a very marvelous feat for a physical force. But even suppose it possible, yet the particles as they approach each other, instead of losing any of their mutual attraction, have it, as we have seen, vastly multiplied. Whence then

comes the atomic repulsion? Indeed, whence the increase of gravity? Here both the initial force is multiplied and another force absolutely created. On the other hand, if it is granted that neither of these forces preceded the other, and that neither could be changed into the other, what hinders us from predicating the same of the balance of the elemental forces.

Not only do the advocates of this hypothesis encounter these perplexities at the outset, but the worlds into which the homogeneous fire-mist is finally rolled present difficulties equally as formidable. If their theory is true, the farther a planet is from the sun, the larger, the lighter and the swifter it should be. What are the facts?[5] Mars is smaller than the Earth, Uranus smaller than Saturn, Saturn smaller than Jupiter, and succeeds immediately to a host of planets which, on account of their smallness, are almost immeasurable. It is true the period of rotation generally increases with the distance from the Sun, but it is in the case of Mars slower than in that of the Earth, and slower in Saturn than in Jupiter. A few pages farther on[6] Humboldt remarks: "Taking water as the unit of density, Mercury is 6.71; Venus, 5.11; Earth, 5.44; Mars, 5.21; Saturn, 0.76; Uranus, 0.97; Neptune, 1.25; the Sun 1.37." The Sun, instead of being denser than any of its satellites, is but one-sixteenth heavier than Neptune, the outer one, and nearly five times lighter than Mercury, the inner. The comets and the moons of Uranus move in orbits whose planes lie at angles that flatly contradict this theory; and as upwards of seven millions of the former visit our solar system and as they are among the largest bodies known, no hypothesis which their facts oppose can long survive.

The spectroscope, in its examination of hundreds of nebulæ, has indeed found many of them to be what their name purports, thin banks of nebulous matter, but without exception heterogeneous in their nature, while at the same time not sufficiently so to render them fit building material for any such worlds as at present exist.

Against the assertion that the universe is without beginning in either space or time, Dr. Robert Patterson has ably urged that a continuous cloud of nebulous light would be overspreading the firmament, were that the case. There would be no blue sky, but one

[5] Humboldt's Cosmos iv., page 425.

[6] Ibid, 447.

unbroken milky way, made up of the blended light of an infinitude of suns. It cannot be argued that it would be impossible for light from multitudes of them to have yet reached us because of their inconceivable distance; for since the rays started out on their journeyings, there has been an equally inconceivable lapse of time. He also remarks that if the universe is without bounds it must be without a common centre. We at once see that in the supposed original homogeneous nebula there must have been as many centres as there were particles. Every particle must have attracted every other equally, and have thus hopelessly prevented that initial motion without which the evolution of the present irregular masses of heterogeneous matter whirling through space never could have occurred. But to grant that the universe has bounds is as fatal to atheism as to concede to it a beginning; for, as the same author observes, if a reason can be assigned why one portion of space is occupied and not another, which in this case the atheist would be forced to do, that reason must show a cause, and that cause must not only have antedated the universe, but have been sufficient to produce it.

Sir David Brewster in his "More Worlds than One," (page 27) remarks, "Mr. Otto Struve and Mr. Bond (Professor at Cambridge, Mass.) have lately studied with the great Munich telescope at the observatory of Pulkowa the third ring of Saturn, which Mr. Lassell and Mr. Bond found to be fluid. They saw distinctly the dark interval between this fluid ring and the two old ones, and even measured its dimensions, and they perceived at its inner margin an edge feebly illuminated, which they thought might be the commencement of a fourth ring. These astronomers are of opinion that the fluid ring is not of very recent formation, and that it is not subject to rapid change; and they have come to the extraordinary conclusion that the inner border of the ring has since the time of Huygens been gradually approaching the body of Saturn and that we may expect sooner or later, perhaps in some dozen of years, to see the rings united with the body of the planet." If this be true, the fact, to say the least, is quite damaging to the Nebular Hypothesis.

Against it also stands the celebrated law of Carnot. Helmholtz, in his Introaction of Natural Forces,[7] thus states it: "Only when heat passes from a warmer to a colder body, and even then only

[7] Youmans ubi supra, page 228.

partially, can it be converted into mechanical work." An equilibrium, therefore, is constantly being approached, the warmer bodies imparting their heat to the colder; energy under new forms is constantly appearing, but only a part of this can be re-converted into heat, and only a part of the resultant heat can be turned again into other energy. A state of rest is approaching, otherwise perpetual motion would be possible in nature, an achievement, of course, utterly out of the reach of realization; for to illustrate, if a weight by its fall could turn a wheel and the wheel raise a weight equal to the initial one, then that weight would prove to be heavier than itself. Helmholtz[8] justly claims that in order to have the planetary system eternal the worlds must, first, be solid, and, second, must whirl in perfect vacuum. The behaviour of Encke's comet indicates that the latter is not true; and as to the former, our own Earth is largely fluid, there are signs of water on Mars; indeed the Sun, Venus, Mars, Jupiter and Saturn are held by astronomers to be enveloped by an atmosphere. "The motion of tides produces friction, all friction destroys *vis viva*, and the loss in this case can only affect the *vis viva* of the planetary system. We come thereby to the unavoidable conclusion that every tide, although with infinite slowness, still with certainty, diminishes the store of mechanical force in the system; and as a consequence of this the rotation of the planets in question around their axis must become more slow; they must therefore approach the Sun, or their satellites must approach them." Speaking of the Sun's heat[9] he remarks that "the inexorable laws of mechanics indicate that their store of force, which can only suffer loss and not gain, must be finally exhausted."

The universe, consequently, must at last become a single mass of motionless matter, unless new energy is introduced into it from without; and if it is true that it is approaching its end, it is equally true that it has had a beginning.

Dr. Bushnell in an article on Progress forcibly argues that common sense itself has been outraged by the theory that the present system of progression extends back in an unbroken series infinitely. However slow the advancement, perfection must have been reached numberless times, for eternity, though past, is no less an endless du-

[8] Youmans ubi supra, page 242.

[9] Youmans ubi supra, page 245.

ration; and what finite ideal could still be unfulfilled, if toward it an infinite number of approaches have already been made? Here and there a thinker apparently foreseeing this dilemma has, as he observes, taken refuge behind the assertion that nature by some law of its own runs in cycles, returning into itself by as many relapses as it makes advances. But this is no real progress; it is simply the monotonous vibration of a pendulum. Humboldt in his *Cosmos* and Spencer in his *First Principles* advocate this view; but the vast majority of the philosophers of this school stoutly deny any retrogression. Emerson in his *Conduct of Life* says, "No statement of the universe can have any soundness which does not admit the *ascending* effort. The book of Nature is the book of Fate. She turns the gigantic pages leaf after leaf, never *re*turning one."

Such are some of the seemingly fatal flaws in the foundations on which evolutionists are still busily building an imposing biological superstructure. To a brief examination of this we now turn.

Max Müller, in his lectures on Darwin's Philosophy of Language, tells us that Professor Haeckel, the most distinguished and strenuous advocate of Darwinism in Germany, claims that in the present state of physiological knowledge the idea of a Life-Giver has become unscientific; that the admission of one primordial form is sufficient, and that that form was a monod, consisting of matter without form or structure, carbon in the form of the white of an egg, of a chemical nature only, and that this monod is the product of self-generation. Herbert Spencer, in his *First Principles*, expressly states, "Those modes of the Unknowable which we call motion, light, heat and chemical affinity, are alike transformable into each other and into those which we distinguish as sensation, emotion and thought, solar heat being the final source of the force manifested by society." It is claimed by this school of Philosophy that appetites and passions are but attractions akin to those of an acid for an alkali; that even actions of will are but chemical changes necessarily accompanying a particular organization of nervous matter. Professor Huxley, also, in an article on the Physical Basis of Life which attracted considerable attention in scientific circles three or four years ago, held that protoplasm, consisting of carbon, hydrogen, oxygen, and nitrogen in complex chemical union, is the very matter and basis of all life. Professor Tyndall in his chapter on Vitality, near the close of his *Fragments of Science*, remarks, "Are the forces of organic matter

different in kind from those of inorganic? The philosophy of the present day negatives the question. It is the compounding in the organic world of forces belonging equally to the inorganic that constitutes the mystery and miracle of vitality. The tendency indeed of modern science is to break down the wall of partition between the organic and inorganic, and to reduce both to the operation of forces which are the same in kind, but whose combinations differ in complexity. Consider now the question of personal identity in relation to this of molecular form." After speaking of the continual waste and renewal of the body, he continues, "How is this sense of personal identity maintained across this flight of molecules? To man as we know him matter is necessary to consciousness; but the matter of any period may be all changed, while consciousness exhibits no solution of continuity. Like changing sentinels, the oxygen, hydrogen and carbon that depart seem to whisper their secret to their comrades that arrive, and thus while the *non ego* shifts the *ego* remains intact. Constancy of *form* in the grouping of the molecules, and not constancy of the molecules themselves, is the correlative of this constancy of perception. Life is a *wave* which in no two consecutive moments of its existence is composed of the same particles. Supposing, then, the molecules of the human body instead of replacing others and thus renewing a pre-existing form, to be gathered at first hand from nature, and put together in the same relative positions as those which they occupy in the body, that they have the self-same forces and distribution of forces, the self-same motions and distribution of motions—would this organized concourse of molecules stand before us as a sentient, thinking being? There seems no valid reason to believe it would not. Or, supposing a planet carved from the sun, and set spinning around an axis and revolving around the sun at a distance from him equal to that of our earth, would one of the consequences of its refrigeration be the development of organic forms? I lean to the affirmative. Structural forces are certainly in the mass, whether or not those forces reach to the extent of forming a plant or an animal. In an amorphous drop of water lie latent all the marvels of crystalline force, and who will set limits to the possible play of molecules in a cooling planet? If these statements startle, it is because matter has been defined and maligned by philosophers and theologians who were

equally unaware that it is at bottom essentially mystical and transcendental."

Note the doctrine. Merely molecular force is declared sufficient to account for the evolution of a molten mass into a peopled world. It is denied that vital force exists as an entity distinct from the molecules and their forces which make up the organism. Life is resolved into a *wave*, a *form*, which on the disintegration of the body is gone like a dream; the *ego* consisting simply in a *relation* which *non-egos* bear each other—an empty impersonation, a figment of the fancy. As soon as the testimony of self-consciousness is thus impeached, the mind is at once afloat in a sea of doubt. This doctrine is not only a death-blow to morals and to our hopes of immortality, but effectually undermines the very possibility of any theistic faith, for our conceptions of the Divine nature are alone predicable on those of the human. When Spencer, Huxley, Bain, Tyndall and others of the evolution school thus assert that no impassable gulf separates the inorganic from the organic, that the forces of the one differ from those of the other only as one motion differs from another—that heat or electricity become not only thought, emotion or action of will, which are simply the phenomena of the *ego*, but the very *ego* itself, by changing the motion of identically the same matter—we must hold them to accurate experimental demonstration; for, as, as we have said, the doctrine is a death-blow to everything noble in aspiration or hope.

It seems to me that Tyndall has unconsciously suggested a most powerful argument against the soundness of his own conclusions. He has championed the theory that the forces in the inorganic world are entities, not mutually convertible, maintaining their individuality intact under all circumstances; that only energies are interchangeable. What hinders the same discrimination being made in the realm of vitality between energies and forces, the one being simply convertible motions, the other being inconvertible entities, concerning whose nature science can safely make no statement? As far as I can see, precisely the same arguments apply.

Dr. Carpenter, in his article on the Correlation of Physical and Vital Forces,[10] states that "the best physiologists of the present day separate into a distinct category vital phenomena, claiming them to differ *in kind* altogether from those of physics or chemistry." They

[10] Youmans ubi supra, page 402.

are produced by what he styles germinal capacity, an inherent hereditary power power within the germ, an agency whose office it is simply to direct in the use of light, heat, electricity and the other elemental energies, and thus by their help build up matter into an organism answering to an ideal given it. The vital force is supposed not to supply a single particle of energy, but only to turn into its own individual channel a portion of what it finds outside. The Arabian romance of the slave-genii and Aladdin's lamp here finds its realization. While the physical and chemical forces are subject to the vital, the resulting energies assume entirely new features; but so soon as the spell is broken they become as before. When molecules enter the organism, they part with none of their molecular forces; when they go out from it they leave none behind; while in it those forces continue as operative as ever, being simply directed, for the time being, by some separate, superior force; for so soon as it is gone at death's coming, they straightway set themselves at work to tear down what they have until then been forced to build up and maintain. These elemental genii are no willing servants to the lamp, but slaves rather, ready, when released, for riot and ruin.

As Dr. Carpenter stands in the forefront of science, and may be said to speak *ex cathedra* on a theme of such transcendent interest, it will be well for us to note with especial care the ground he has taken. These are his words[11]: "If in the first place we inquire what it is that essentially distinguishes vital from every kind of physical activity, we find this distinction most characteristically expressed in the fact that a germ endowed with life develops itself into an organism of a type resembling that of its parent; that this organism is the subject of incessant changes which all tend, in the first place, to the evolution of its typical form, and, subsequently, to its maintenance in that form, notwithstanding the antagonism of chemical and physical agencies which are continually tending to produce its disintegration; but that, as its term of existence is prolonged, its conservative power declines so as to become less and less able to resist these disintegrating forces, to which it finally succumbs, leaving the organism to be resolved by their agency into the components from which its materials were originally drawn.....That condition, which is inherent in the organism, being derived hereditarily from

[11] Youmans ubi supra, page 407.

its progenitors, may be conveniently termed its germinal capacity, its parallel in the inorganic world being that fundamental difference in properties which constitutes the distinction between one substance, whether elementary or compound, and another."

Herbert Spencer not only affirms that all the multiform varieties in inorganic nature have been evolved from strict homogeneity, but he most positively states that the same is true of the still greater diversities in the realms of life. In his collection of *Essays of Progress* (page 2) he says: "In its primary stage every germ consists of a substance that is uniform throughout both in texture and chemical composition." Whence then the succeeding heterogeneity? we may ask. It is surely not the result of any one physical or chemical force, for if science has proved anything it has proved that a simple element, as gold or oxygen, has no power to change itself, or to undergo change, by being mixed only with its like. Then some force separate and superior must be at work. But to grant this would be fatal to his philosophy, for the germinal substance cannot be homogeneous if two or more forces are lodged with init. Turning again to Tyndall's *Fragments of Science*,[12] we find how entirely gratuitous is this statement of Spencer, although it is one of the foundation stones in his system of thought.

"When the contents of a cell are described as perfectly homogeneous, as absolutely structureless, because the microscope fails to distinguish any structure, then I think the microscope begins to play a mischievous part.....Have the diamond, the amethyst, and the countless other crystals formed in the laboratories of nature and of man, no structure? Assuredly they have: but what can the microscope make of it? Nothing. It cannot be too distinctly borne in mind that between the microscope limit and the true molecular limit, there is room for infinite permutations and combinations."

Science has thus far also proved powerless to settle satisfactorily the question of spontaneous generation. Many very ingenious experiments have been made, revealing new truths in biology, but resulting only in strong presumptions respecting the point at issue; and of these each party manages to secure about on equal share. Positive demonstration remains yet unattained. Huxley in his *Origin of Species* says, "Nobody has yet built up inorganic matters into living, organized protein; and I suppose it will be a long while

[12] Page 152.

before any one does. A distinguished foreign chemist contrived to fabricate Urea, a substance of a very complex character, which forms one of the *waste* products of animal structures. Of late years a number of other compounds, such as butyric acid and others, have been added to the list. I need not tell you that chemistry is an enormous distance from the goal I indicate." But Huxley seems quite hopeful that it will some day be attained. All of what was supposed to be spontaneous generation has been found to come from minute spores or eggs floating in the atmosphere, which heat would not kill or which would lodge in cotton wool if placed in the mouth of the flask containing the prepared liquid. The air is full of "germ dust." Huxley gives a very interesting history of the attempts of chemists in this direction, showing how that, on close examination, in each were found fatal defects. A fluid preparation was shut from the outer air, as it was thought, by being inverted in a bed of mercury, and after a while infusoria appeared; but it was afterward discovered that the mercury was fairly saturated with spores. A bottle was filled with boiled milk, and the neck stopped with cotton wool, with the same result; on further examination it was found that the alkaline in the milk protected the spores from the effects of the heat. The milk was made ten degrees hotter, and no animalcules appeared. M. Pasteur finally filled a vessel having a long S-shaped neck with an extremely decomposable substance. This he boiled and left the bottle open. No life appeared, the eggs from the outside air being deposited, as afterward found, in the beginning of the bent neck. The tube was then cut off near the vessel, and in forty-eight hours life developed. These and other like tests Huxley regarded as settling the question that at the time of his writing no instance of spontaneous generation had yet come to light. Dr. Bastian, who has indeed proved himself both earnest and able in this field of inquiry, has lately issued a second work in which he claims that he has beyond all doubt produced life from chemical action solely, but even his most careful experiments are found far from conclusive. Grant that after he had so bottled some prepared liquids that he had to all appearance wholly excluded the outside air and that then he had subjected them to temperatures reaching as high as 150° degrees C., and that when the mixtures cooled they swarmed with life; yet this may but serve to prove that eggs when lodged in some mixtures will resist greater heat than in

others, the absolute limit of such resistance being still a matter wholly undetermined. It was supposed that the fact that inside unfertilized eggs infusoria had appeared, settled the matter, until some prying individual announced that he had discovered the spores of infusoria deposited in the hen's ovary. The editor of the *Atlantic Monthly*, in a brief review in the December number, 1873, showing the present status of the discussion, points out how inconclusive as yet are even the most successful experiments.

We must for the present defer following further the doctrines of evolution. One word in closing. While the ancients believed that everything was God, many modern theorists are seeking to exclude God from everything. There is a golden mean of belief, between the poetic pantheism of the past and the materialism of to-day. The overshadowing presence of mystery gave birth to the one; the partial solution of it, the other. A more thorough investigation will exhibit alike the weakness and the strength of both. What lies back of gravity, chemical affinity, crystallization, organic life, brute instinct and the human intellect, still keeps itself closely veiled. On questions touching the origin, the nature and the ultimate destiny of the physical and vital forces, science is gradually growing conscious of her limitations.

WM. W. KINSLEY.

FROM THE NOTE-BOOK OF AN ISHMAELITE. II.

NOTHING so exemplifies the vigor of the human intellect as its power to react against popular idolatries, and to swing itself into new lines of movement which are exactly the opposite of those it has been following. And no more notable reaction has occurred in our century than the revival of Pessimism. I say *revival*, for Pessimism was the primitive creed of mankind so far as it had any conscious theory of the Universe, and our popular Optimism is the product of reflection and loose reasoning within a sophisticated civilization. Our old Teutonic and Scandinavian forefathers were pessimists; they saw all around them a conflict between good and evil, between light and darkness, and they foresaw the victory of the latter. But with full prevision of that

victory, they held to the losing side, as the only side for a man to hold to. Their mythology closes with the cry "Balder is dead," and with the wail of gods and men over the desolation of heaven. And the most outspokenly pessimistic creed that the world has ever known is also the most popular. Buddhism, which found in every part of Eastern Asia a hearty welcome as an escape from the soulless, formal and official religions, like the Shintoism of Japan, into a higher region of freedom and spirituality, is itself the most dismal of beliefs. It teaches that existence itself is the curse of mankind, and the escape out of existence into nothingness the only salvation. Schopenhauer and Edward von Hartmann have merely translated Buddhism into the language of Western philosophy, and offered it as wholesome food to a generation sick of the optimistic sweetmeats of the popular philosophies. Ever since Hegel discovered that "the actual is always rational," and in that discovery crowned the edifice on which thousands had been laboring for centuries, Germany heard nothing but the deification of the Universe, as itself in some sort the Absolute and Perfect. The apotheosis became nauseous when its litanies were repeated with endless iteration by smaller men. There was thus a certain preparedness for the new school, which bedevilled all things with as much energy and still more eloquence. The school of Hegel has itself furnished the best disciples for Schopenhauer, and this gloomy philosophy—*die moderne Weltverteufelung*, Edmund Pfleiderer calls it—has become the fashion of the day. There are signs of its spread to France, England and America, where Pessimism has always been a sentiment among the poetical admirers of Byron, Poe and Baudelaire, but has never attained recognition as a philosophic doctrine. Yet even in England and America it has had its forerunners in the orthodox Political Economists, and among those theological Millennarians who regard the present condition of the earth as one of rapid moral degeneracy. Emerson also, with his declaration that "there is a substratum of ferocity in the universe," seems not so far from Schopenhauer's "*Welt als Wille.*"

To the Pessimist, Asiatic or European, life is a bad dream whose fundamental fallacy is the delusion of individuality. Every act that involves the will to be or exist is an evil act; every act that tends to self-mortification, to the annihilation of the individual, is a good act. But suicide is not a good act, for to man death is not the end

of individual existence. After exhausting life of its worth and significance, the Pessimist gives us a cheap immortality by the extension of this worthless life into the indefinite future.

The creed will never be exactly popular, but it will probably have many adherents among English-speaking people. Melancholy is in the blood of the Teutonic race, and upon every sort of constitutional melancholy Pessimism builds itself. About one-third of us have passed periods of greater or less length in which utter annihilation seemed the best boon that heaven could send us. Christianity has been fighting this fundamental tendency to gloom for a millennium, and with a fair degree of success. But as new questions and new sympathies move the thoughts of the peoples, and as the theologians meet these with answers which seem to make Christianity only an inconsistent Pessimism—a creed that commands men to "Rejoice always" and yet deepens the shadows of the moral universe to us—the Christian religion becomes an influence in the opposite direction to that in which it affected our forefathers. They clung to it as a release from the natural gloom which overhangs life—as a revelation of better things than they had dreamed of. "So seems the life of man, O King," said the Northumbrian Ealdorman, "as a sparrow's flight through the hall when you are sitting at meat in the wintertide, with the warm fire lighted on the hearth, but the icy rain-storm without. It flies in at one door, tarries for a moment in the light and heat, and then flies forth from the other into the wintry darkness whence it came. So tarries for a moment the life of man in our sight." And, therefore, they listened to the message of One whose presence was a light and a warmth that embraced all worlds, and made the earth's light and warmth the symbol of a greater blessing whose bounds none could set. But now we are told that Christianity means a sort of individual insurance against the dreadful possibilities of a universe which has, as Emerson says, a "substratum of ferocity" in it.

What a frightful misfortune it will be for the race when the whole surface of the globe shall have been explored, described and catalogued by our geographers! Imagination will be cramped, and the interest in dear Mother Earth will become weak and paltry in comparison with what it was in the grand old days before the Columbuses and Magellans began to exercise their impertinent curiosity.

We shall have come to know all the possibilities of our planet, and no longer to look forward into the darkness with awe or excitement. Even now the unknown spaces left on the map have a sort of melancholy interest for a well-regulated mind. There are bits of Siberia to which I feel an attachment not unlike that which I cherish for the old stone farmhouse in which I was born, and the "sunny spots of greenery" around it, in which the happiness of childhood found scope. Such places are the lands of *may be;* the dear spots where the sacred depths of nescience have not been fathomed. And as we love our friends partly because of our faith in possibilities of character never as yet realized, so our love for this, our oldest friend, associates itself with the regions of the unknown on her surface. There is a good as well as a bad sense to the saying, *Omne ignotum pro mirifico.* The poetry of the world, in one of its most cherished forms, connects itself with this feeling. You would rather diminish from the popularity of the Arabian Nights than add to it, by prefixing to them a careful description of Bagdad and its people under the reign of Haroun the Just. And what is the source of the thrill with which we read Coleridge's poem which begins—

> In Xanadu did Kubla Khan
> A stately pleasure-dome decree:
> Where Alph, the sacred river, ran
> Through caverns measureless to man,
> Down to a sunless sea—

if it be not the mysterious remoteness of the unexplored surroundings? Similar is the feeling excited by the single line in the Fool's song in Lear—

> Childe Roland to the dark tower came—

a feeling which Browning has managed to expand and intensify by his poem in *Men and Women,* taking care not to remove an atom of the mystery.

And our scientific Philistines march right on to disenchant the most outlying and unprofitable places—lands that might have been spared for the growths of fancy, since they will grow nothing else. There are Nordenskjold and his Swedish associates attacking even Siberia; and after seeing the man at the Exhibition, I begin to fear he will not leave much of those dear old arctic districts unexplored when he dies. Thus does the sacred thirst for knowledge burn in the civilized breast. That a thing is, is a reason why it should be

known, searched out, explored, described to the perception of whoso will know of it. "It should be known," the logic runs, though to supply all the links of the reason would puzzle anybody. But to one who knows both the telescopic and the microscopic extent of the universe, the vastness of possible knowledge must be an overwhelming thought, in hours not distracted by activity in reaping some new fragment of it. And if there be no infinite mind capable of grasping it in both directions, the whole can never be known; cannot even be—as some one says—truly a *universe;* cannot be one thing to any one mind.

Vanity and bashfulness are but two growths of the same root, an undue self-consciousness. Backward or shy people are generally such from the lack of simplicity, not from the excess of it. They are aware of a possible difference between your and their own estimate of themselves, and this makes them uncertain of their footing with you.

A mind perfectly sane on this point ceases to think of self in society, because settled in its own self-respect and on sure grounds. But a mind unsettled on this point perpetually vibrates between what seem opposite extremes, both of which lie of necessity within the arc of its movement. Distrust all bashfulness in grown persons who have had ordinary social advantages, as a sign of self-conceit.

The prevalence of self-conceit is like the practice of smoking tobacco, a great deduction from the capacity and energy of the race. Dr. Thomas Arnold goes so far as to pronounce it the root of every sort of mental weakness and incapacity. Great men are generally simple and self-forgetful; and as a rule young men begin to be worth something when they have quietly buried their own dreams of greatness and success in life. Life deals with us roughly, giving us many a rude shaking by the shoulders; but it is generally for our good. It knocks the nonsense out of us, and leaves room for the sense.

Our spelling bees have culminated in a Convention for the reform of our orthography by the introduction of a phonetic system. All the decimal system people should be expected to belong to the organization which has grown out of the Convention, or else should be asked their reasons for refusing. It seems to me that all

the reasons which favor the substitution of grammes and metres for pounds and yards, apply with equal force to the substitution of *nolleʃ* for knowledge and *thru* for through. If not, why not?

Mark Twain recently put in a plea for the good old times when the rules of architecture were strict and those of orthography optional. He remarked that Bacon, Shakespeare, and their contemporaries, each spelled after their own fashion; and that it was much better that each writer should give somewhat free play to his own idiosyncracies, than that all should be tied down to a dead uniformity on this point. Yet Mr. Clemens, like every body else, bows to the authority of the school-master, and spells in accordance with orthodox orthography. The only notable dissenter in practice was Archdeacon Hare, who sought to revive the orthographic canon of the seventeenth century, as better than that of the nineteenth. Hence his phonographic spelling of many past tenses and perfect participles, such as *accomplisht*, and his rejection of the ordinary spelling of some words (such as *sovereign* instead of *sovran*) as based on false etymologies. His essay on the subject, published in the *Philological Museum* in 1832, shows on what slight and narrow foundations our traditional orthography rests. He especially shows that Milton, who had given no small amount of attention to the subject, used an orthography fully sanctioned by all his best predecessors in English style, but in many points utterly different from that now in vogue. The ordinary editions of Milton's works get rid of these peculiarities, and reform nearly everything to the modern usage; but in Pickering's very exact reprint of the first edition of *Paradise Lost* (1873) the original forms of spelling strike the eye at once. Thus, he has *rowle* for *roll*, *perfet* for *perfect*, *thir* for *their*, *voutsaft* for *vouchsafed*, *fluts* for *flutes*, *anow* for *enough*, *intrans't*, *glimps*, *hight*, *maistring*, and many others; and that he had given thought to the subject is evident from the list of *errata* in which *hundred* is changed to *hunderd*, and *we* is corrected into *wee*, this latter evidently for the sake of emphasis, as the pronouns *we ye*, *he*, *she*, occur with both spellings in the poem, and as the double *e* seems to be used always where the word is emphatic.

The American substitutions of *ic* for *ick* except in monosyllables, and of *or* for *our* in the ending of many words, are the only innovations which have obtained general acceptance even on this side the ocean. The spellings *center* and *theater* still linger in a few

printing offices to which the better sort of public opinion has not found access; but there is no reason to suppose that they will ever succeed in establishing themselves in the usage of educated men. The chief reason against them is that they logically involve the whole phonetic theory and system; for if we substitute *center* for *centre*, then we must go on to spell able *abel*, and then where are we to stop? We would exchange one wretched bondage to the letter for another still more wretched and less historical.

The next great centennial celebration is to be that of the fourth centenary of the establishment of printing in England by William Caxton, in 1477. A much greater, but utterly neglected benefactor of the race, was the man who invented rag-paper. Printing was quite within the mechanical capacity of the Egyptians, Greeks and Romans, and they would certainly have "invented" it had it been worth their while. The man who devised a method of supplying a great quantity of surface capable of receiving a written or printed impression, made the invention of printing merely a question of time. But so long as the world had nothing but the very limited supply furnished by parchment and the papyrus plant, the printing press could be of no use to it. The invention of paper of course long preceded its manufacture in any large quantity, and the two centuries or more that intervened between the two inventions was probably no more than was needed to bring the first of the two to such perfection and popularity as led to the second. The oldest known document on paper bears the date 1329, but it is said that the Escurial library contains some of the previous century.[1] As to its introduction into England, the late Toulmin Smith says: "The introduction of specimens of linen paper into England is known to have happened in 1342, possibly earlier. Some letters from abroad during that early time are written on linen

[1] Our contributor is not quite correct as to the antiquity of paper. The Saracens learnt from the Chinese the art of making it from cotton, and had a factory at Samarcand in 706, A. D. And an Arab physician, in his account of his visit to Egypt, A. D. 1200, speaks of the linen cloths in which the Egyptian mummies were wrapped as used to make wrapping paper. The Saracens brought the art into Spain. In a monastery in upper Styria is a paper document, written in A. D. 1240, and purporting to be a mandate of the Emperor Friedrich II.

paper; and there is a Register-book which belonged to the Black Prince [ob. 1377] which is of linen paper.....There was at least one paper mill in England as early as Henry VII." "Linen paper was used in public offices in London, and also used by some of the country gentlemen, who were then sheriffs of distant shires, at the end of the fourteenth century." He found among the national records a bundle of writs issued from the Royal Chancery to the Sheriffs of the Kingdom, with the returns appended or endorsed, and in closely examining some that had been written at the date specified, he discovered that they are written on a sort of parchment paper, which was evidently home-made. "It is of the color and stoutness, and has the general appearance of parchment; but the wire-marks of the linen fabric that forms its basis are to be seen on a careful examination. It is, however, so like parchment, that an ordinary handling of it would not lead to the supposition that it is not parchment, and like the rest among which it is found."

Shakespeare, with his usual historical accuracy, makes Jack Cade refer to both printing and paper-making as introduced into England in the reign of Henry VI., which is a reign too soon for the former, and two reigns too late for the latter. These dates indicate a pretty rapid spread of the invention through Europe; while even in our times, the lettered class are slow to adopt improvements from abroad. Take for instance that excellent German invention, the double title-page, which has been adopted nowhere else, except in a few cases for an edition of an author's collected works. Our public documents are in the sorest need of it. For instance, it is all but impossible to arrange, or catalogue, the valuable volumes of Hayden's Survey of the Territories. The title-page of each of its parts is a puzzle and a distraction to librarians, whereas a little care in the preparation of double title-pages would have reduced the chaos to an admirable order. J. D.

HENRY C. CAREY IN GERMANY.[1]

IN a short essay, Baron William von Kardorff-Wabnitz, a member of the Imperial German Parliament, sets forth his reasons for advocating Mr. Carey's theories, and urges their adoption in the practical working of trade, finance, and tariff, instead of the present fashion of English free-trade doctrines. He endorses Carey's laws of national wealth as applicable to the existing state of affairs in Germany, and he urges the study of Carey's works, instancing the fact of his own conversion from Free Trade to Protection, as one of the first fruits of reading Carey's *Social Science* The strong position held by Mr. Carey in Germany and Russia is attested by this little essay, with its constant reference to the frequent use of Carey's theories and proofs in all discussions of the important questions treated by him in his well-known volumes. The author boldly declares himself in favor of maintaining a Protective Tariff based upon that which was for years common to Russia, France and America, and urges the example of these countries, and the success of their national industries in time of high protective duties, as a reason for renewing them in Germany, so as to restore its old prosperity.

A few years of an energetic system of protection served to establish the fame and use of American agricultural machines and railroad cars through the world.

France has withstood the results of a disastrous war, and has reëstablished its trade and its manufactures on a greater scale than ever, by keeping up its system of Protection, and leaving to a few theoretical professors the luxury of believing in Free Trade. Our German economist contrasts sharply the theories of Adam Smith and Henry C. Carey as to the wages of labor, and cites, with great emphasis, the rule laid down by Carey, that the wages of labor always advance faster than the profits of capitalists. He urges on the German farmer the invariable truth that protection to native industry means a gain to the farmer, who can sell his pro-

[1] GEGEN DEN STROM! Eine Kritik der Handels politik des deutschen Reichs an der Hand der Carey-schen Forschungen, von Freiherr *Wihelm von Kardorff-Wabnitz*, Berlin, 1875. Verlag von Julius Springer. [Against the Current! a review of the Tariff Policy of the German Empire in the light of Carey's Discoveries.]

duce to workingmen at hand, as well as to the manufacturer, who in his turn secures good workmen when he can get them cheap food. He shows that Germany has lost the exportation of grain to England, which draws its supplies from Russia and America; that German wool has been driven out by colonial wool; that rape seed has surrendered to petroleum; that foreign countries have practically excluded German spirits; that these and other harsh conditions have proved unfavorable to German agricultural industry, which has been still more depressed by the growing importation of cloth, and woolen goods, and iron ware, all of which could and ought to be made at home. Germany imports seventy-five millions of agricultural products, which she ought to raise within her own borders. The very land-holders have brought this about by their Free Trade doctrine, and by their hostility to manufactures, with the invariable result of reducing the land-owner from his apparent importance to the lesser but more useful task of a food supplier to the factory hands, the real wealth-producers of a country. Even the serious question of "strikes" is more likely to be solved by a steady system of protection, than by irregular and fitful changes from high to low wages, or back again.

Our German tariff man seconds heartily all of Mr. Carey's views as to the system by which Great Britain built up its present overwhelming strength in textile and iron industries; shows that even now foreign goods pay fifteen per cent. duty in the colonies, while English wares pay only five. He adopts Mr. Carey's rule that cheap production depends, not on cheap labor, but on amount of production, certainty of market, and cheap and constant supply of raw material. He points out the advance in American textile industry in contrast to the falling off in Germany, and shows that the Tariff which has done this, can and ought to be maintained, and do even more. In iron, too, while Germany imports yearly four millions' worth, it can hardly be said that over-production makes its manufacture unprofitable. The same protection which has made America independent would give Germany, too, control of its own supplies of iron. France, with its high duties, is in a more flourishing condition than any country that has adopted Free Trade. Even England, with its boasted free list, shows in its dealing with the duty on spirits a shrewd sense of how and when to protect. There is, it is well known, a drawback or premium on exporting spirits made in Eng-

land, and there is also a positive prohibition on foreign spirits, for they cannot be methylated, although English spirits used in the arts are free, and receive back the duty paid on them. As half the production is thus used, English spirits pay only half the tax, while the foreign have to pay the full amount levied, no matter to what use it is put. When a foreigner asks why this should be so, the English free trader tells him that native spirits are always dearer than foreign, but the trade is too profitable to be given up for the sake of a theory.

The persistency with which England enforces its Free Trade policy at the expense of the other nations and of its own colonies, is marked by evils that show the unsoundness of its whole financial theory. Capital and labor are growing daily more estranged; class distinctions multiply and increase; the middle class is fast disappearing both in agriculture and manufacture; of two hundred thousand land-owners in Adam Smith's time, only thirty thousand are found to-day; the country is losing and the towns gaining in population; the spirit of trade and the passion for industry have cost and are daily sacrificing national pride, until instead of being the mistress of the seas, England depends on Russian favor for her East India possessions. For the working of Free Trade and Protection in other countries, the author draws his illustrations from Carey's volumes as the source of the soundest knowledge on the subject. The fall of Turkey dates from the time when England and France obliged that unfortunate country never to impose a higher duty than three per cent. on their goods, and thus destroyed native industry only in turn to levy fresh taxes, in the vain hope of recouping the English holders of Turkish bonds. Portugal is another illustration of Free Trade. Even Germany has its own special example in Mecklenberg, which is full of all the mischiefs that illustrate the working of Free Trade. With Mr. Carey's examples drawn from our own experience in the United States, we are all but too familiar.

In Russia, in spite of all the disadvantages of its old system of serfdom or peonage, the results of a wise protective system have been surprising, industrial and manufacturing activity steadily and rapidly increasing, railroads and canals covering the whole vast empire, the export of Russian products increasing, the imports of iron and textiles on the decrease, advancing wages, improving prices of land, fall of interest, extension of credit, a growing reserve of gold and silver, all symptoms of national advance and

prosperity. But most of all is France the country that attests the truth of Carey's theories. After various experiments in the interest of Free Trade, France has adopted a protective system that is practically prohibitory; and the result is improved wages, favorable balance of trade, plenty of gold and silver, increase of crops, advance in the price of property, diminishing rate of interest, large plans of national improvements set on foot;—and this after paying a war debt of ten milliards and losing two provinces.

Turning now to Germany, the author traces the history of its tariff legislation, and shows that Protection enabled it to pay off its old war debt, to develop its national wealth, to secure German ownership of foreign industries, to supply the country with good roads and afterwards with railroads, to improve agricultural returns and of course the value of land throughout the country, to secure a steady rise in wages and a steady fall in interest. Even the poor provinces of the east became rich as granaries for England, and Silesia, Westphalia, the Rhine land, grew great in iron and textile fabrics, and German woolen goods, cotton goods and linen were exported largely, while the government industriously sought to secure fresh markets by reciprocity treaties. The development of national internal industry was rapid, sound and successful, and it brought with it all the fruits of a sound and wise policy. Now Germany has been turned toward Free Trade, and it threatens to do her a lasting injury by inflicting the usual results upon capital, labor, agriculture and all the allied forces of a great industrial country. The success of the advocates of Free Trade will undo all the great achievements of the soldiers and statesmen who made the Germany of to-day, for it will take away the power to hold together the resources of a great country, and will reduce it to the condition of the other victims of the modern English passion for Free Trade. To meet the views advanced by the German advocates of the Manchester school of political economy, one of their opponents in their own Parliament knows of no better guide than Henry C. Carey, and from his volumes draws the arguments and the proofs with which he meets the Free Traders. It is an interesting example of the far-reaching effects of a sound economical philosophy, and it bespeaks a higher praise of the work done by Mr. Carey, than any mere fulsome eulogy. It shows that his writings are an arsenal of truth, from which all who wage war against industrial error can get their arms, and go forth hopefully to do battle. J. G. R.

NEW BOOKS.

TWO YEARS IN CALIFORNIA: By Mary Cone; with Illustrations. Chicago. S. C. Griggs & Co., 1876.

California has not yet lost its interest. The golden haze which surrounded it has brightened into the light of civilization. The traveler, as a rule, no longer enters it through the Golden Gate, but across those mighty mountain barriers which once fenced it in from the rest of the world, but which science and energy have now overleaped.

It is no longer *El Dorado*, but instead, a land flowing with milk and honey, whose wonderfully diversified climate and always fertile soil brings forth all the productions of the temperate zone, with many of the torrid; whose scenery embraces sea, mountain, and valley; the land of the Yosemite and the giant trees.

Miss Cone has had good opportunities of knowing California throughout its length and breadth, and has improved them. In a systematic manner she takes up its history, geography, climate, social state, etc., giving a clearly written and interesting account of everything, abounding in statistics very acceptable to the casual reader, and which the sojourner, either for health or pleasure or profit, will find useful.

To hazard a conjecture as to the authoress, we should pronounce her to be, or to have been, a school-mistress. Her writing has a didactic tone, a mingling of amusement and instruction, with an occasional moral reflection, which the thoughts of one accustomed to train the young idea, well and faithfully withal, would be apt to assume. If a member of this much-respected class, though, she should be taken strictly to task for various blemishes in her style, such as the too frequent use of words ending in *ness*. On page 80, we find "healthfulness," "nearness," "greatness," "thankfulness," "richness," "perfectness," "transitoriness;" and the production of such slip-shod flippancy as "the olive, too, seems to be in *as good as* its native element in this region" (p. 82); "causing the rarefied air to rise and *hurry away*" (p. 18); "when the wind disturbs the surface of the water, as it almost always *contrives* to do" (p. 101); "the way is slippery and the slime is *ghastly, supernatural, infernal* (p. 157); "a certain person in whom the writer has *a first class interest*" (p. 164).

There is a constant and very ill-advised use of quotations, many of them trite, and some unmeaning. On the other hand, the descriptions, of scenery especially, are clear and vivid; the narrative is lively, with a touch of humor, a little forced sometimes; and the writer looks at all sides of her subject in a manner which gives a clear understanding of it.

The Chinese have a chapter devoted to them, in which the effect

of their advent on the material interests of the country is declared to be good. The writer gives some historical facts about China, and a brief account of Confucius. "China," she says, "furnishes the sole and only example of a nation that has worked out its own salvation from barbarism, and come up unaided into the light of civilization." For this statement she gives no authority—indeed, quotes Niebuhr to the contrary; and it seems to involve a double assumption; first, that any nation has ever done thus, and second, that the Chinese alone have. We were not aware that "the world's history" had a single instance of any community or people which, without the aid of others more enlightened, progressed in any degree from barbarism toward civilization. Of the good qualities of the Chinaman as a laborer we are somewhat cognizant, even in this part of the country; but the important question which the States on the Pacific coast, and indeed all the States, have to determine, does not touch this point, but concerns the effect on the industrial, social and political system of communities, of an immense and sudden influx of Chinese—a matter infinitely more important, but to which the authoress has paid very little attention.

Miss Cone has described the Yosemite Valley rather better than any one whose account we have yet seen. So the other places specially mentioned. She illustrates very happily the charms of Santa Barbara, by the story of the preacher who, holding forth there, felt it incumbent on him to remind his hearers that, as they could not always stay in that abode of delight, they would do well to prepare themselves to go to heaven, which he took pains to describe as equally attractive.

The mechanical execution of the book is good, and it has that invaluable adjunct to a book of travels—a good map.

DARWINIANA: ESSAYS AND VIEWS PERTAINING TO DARWINISM. By Asa Gray, Fisher Professor of Natural History (Botany) in Harvard University. D. Appleton & Co., N. Y.

Although American bibliographers have not been forced to make a separate department for works on Darwinism, corresponding to that entitled "Darwinismus," which is found in most German book catalogues, still publications on the subject have been with us neither few nor uninteresting. We are therefore not surprised at the title "Darwiniana," prefixed to a series of essays by Prof. Asa Gray, the Harvard Professor of Botany.

In these thirteen essays before us, of which all but the last have already appeared in print, he discusses a variety of questions involved in or closely connected with the origin of species by natural selection. The larger question of evolution, as a system of philosophy, which has in a manner swallowed up the scientific theory of the origin of species, and has replaced it in the minds of many, he does

not wish to discuss at all. His own personal views, indeed, he distinctly gives in opposition to "English positivism and kindred forms of materialistic philosophy," which have taken up the derivative theory in their interest. In the preface he defines himself as "one who is scientifically and in his own fashion a Darwinian, philosophically a convinced theist, and religiously an acceptor of the 'creed commonly called the Nicene,' as the exponent of Christian faith." In accordance with this position, he devotes much space to showing that Darwinism is not necessarily atheistical. He proves that it can be accepted equally readily from a theistic standpoint; and, accepting it thus himself, he goes farther and shows that this theory can contribute many elements of strength to the argument for design used in natural theology. From his final paper on "Evolutionary Teleology," a very able discussion of this question, we make an extract illustrative of this. "By the adoption of the Darwinian hypothesis, or something like it, which we incline to favor, many of the difficulties are obviated and others diminished. In the comprehensive and far-reaching teleology which may take the place of the former narrow conceptions, organs and even faculties, useless to the individual, find their explanation and reason of being. Either they have done service in the past, or they may do service in the future. They may have been essentially useful in one way in a past species, and though now functionless, they may be turned to account in some very different way hereafter. In botany several cases come to our mind which suggest such an interpretation."

His acceptance of Darwinism, as already stated in his own words, is a qualified one. This is his characterization of it: "We are disposed to rank the derivative hypothesis, in its fullness, with the nebular hypothesis, and to regard both as allowable, as not unlikely to prove tenable, in spite of some strong objections, but as not therefore demonstrably true. Those, if any there be, who regard the derivative hypothesis as satisfactorily proved, must have loose notions as to what proof is. Those who imagine it can be easily refuted and cast aside must, we think, have imperfect or very prejudiced conceptions of the facts concerned and of the questions at issue."

The attitude of working naturalists towards Darwinism is the subject of a very interesting paper, from which the following statement is taken: "Considerations such as these, of which a few specimens have now been adduced (not general speculations, as the unscientific are apt to suppose), and trials of the new views, to see how far they will explain the problems or collocate the facts they are severally dealing with, are what have mainly influenced working naturalists in the direction of the provisional acceptance of the derivative hypothesis. They leave to polemical speculators the fruitless discussion of the question whether all species came from

one or two, or more; they are trying to grasp the thing by the near, not by the farther end, and to ascertain, first of all, whether it is probable or provable that present species are descendants of former ones which were like them, but less and less like them the farther back we go."

In this same paper, certain fierce opposers of Darwinism are thus quieted: "Those defenders of the faith are more zealous than wise who must needs fire away in their catapults the very bastions of the citadel, in the defense of outposts that have become untenable. It has been and always will be possible to take an atheistic view of Nature; but far more reasonable, from science and philosophy only, to take a theistic view. Voltaire's saying here holds true: that, if there were no God known, it would be necessary to invent one. It is the best, if not the only hypothesis for the explanation of the facts."

In our opinion, essays of this character will do much towards obtaining a respectful hearing for Darwinism with all classes of thoughtful readers, and for this reason we welcome them, and thank Prof. Gray for the service he has done.

BOOKS RECEIVED.

Our Mutual Friend. By Charles Dickens. Condensed by Rossiter Johnson (*Condensed Classics*). 18mo., cloth. $1.00. Pp. 350. New York: Henry Holt & Co. [Porter & Coates.]

Mutual Criticism. 16mo., paper, 25 cents. Pp. 96. Oneida, New York: Office of the American Socialist.

Fallen Fortunes. By James Payne. 8vo., paper, 75 cents. Pp. 223. New York: D. Appleton & Co. [Porter & Coates.]

Heroines of Freethought. By Sara A. Underwood. 12mo, cloth. Pp. 327. New York: Charles P. Somerby. [J. B. Lippincott & Co.]

Captain Sam. By George Cary Eggleston. 12mo., cloth, $1.50. Pp. 217 New York: G P. Putnam's Sons. [Claxton, Remsen and Haffelfinger.]

Boys of Other Countries. By Bayard Taylor. 12mo., cloth, $1.50. Pp. 164 New York: G. P. Putnam's Sons. [Claxton, Remsen & Haffelfinger.]

Essays in Literary Criticism. By Richard Holt Hutton. 12mo., cloth, $1.50. Pp. 367. Philadelphia: J. H. Coates & Co.

The Ethics of Benedictus de Spinoza. From the Latin, with an introductory sketch of his life and writings, by D. D. S. Pp. 338. New York: Van Nostrand & Co.

JAMES RUSSELL LOWELL says: "I may presume to call myself intimate with the *Penn Monthly*, and value it highly as the only magazine known to me in the country wholly devoted to matters of serious concern, and solid in the treatment of them. That it should have maintained itself so long shows a higher average of popular intelligence than I should have expected, and is gratifying in proportion."

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